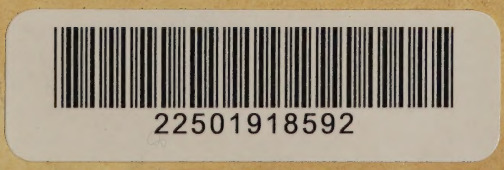
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# JOURNAL

OF THE

# ASIATIC SOCIETY OF BENGAL.

## VOL. LVIII.

PART I. (HISTORY, ANTIQUITIES, &C.)

(Nos. I TO III.—1889 : with 10 plates ; also a Supplement with 2 plates.)

EDITED BY

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"It will flourish, if naturalists, chemists, antiquaries, philologers, and men of science in different parts of *Asia*, will commit their observations to writing, and send them to the Asiatic Society at Calcutta. It will languish, if such communications shall be long intermitted ; and it will die away, if they shall entirely cease." SIR WM. JONES.

CALCUTTA :

PRINTED AT THE BAPTIST MISSION PERSS,

AND PUBLISHED BY THE

ASIATIC SOCIETY, 57, PARK STREET.

1889.

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EDITED BY

THE HONORARY SECRETARIES.

JANUARY TO DECEMBER,

1889.



CALCUTTA:

PRINTED AT THE BAPTIST MISSION PRESS,
AND PUBLISHED BY THE
ASIATIC SOCIETY, 57 PARK STREET.

1890.

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## VOL. LVII.

PART I. (HISTORY, LITERATURE, &c.)

(Nos. I and II with eleven plates, and an Extra-Number with 3 plates.)

EDITED BY

THE PHILOLOGICAL SECRETARY.

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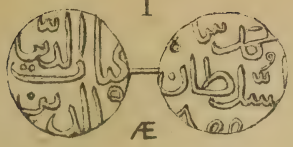

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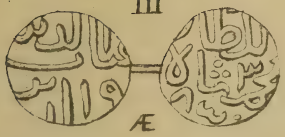

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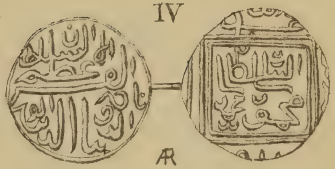

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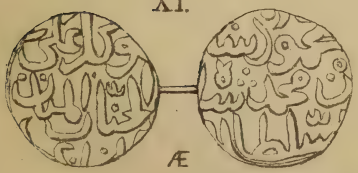

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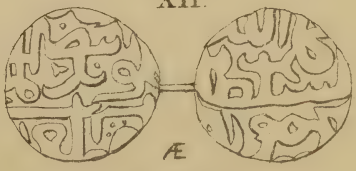

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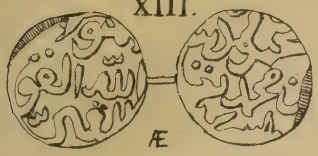

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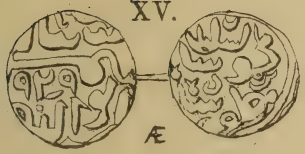

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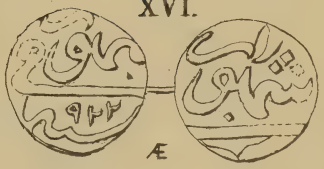

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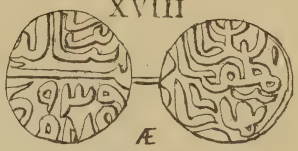

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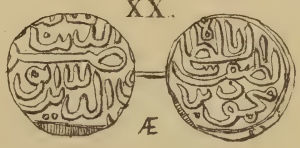

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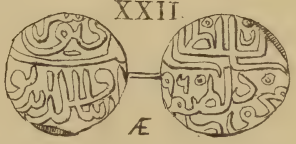

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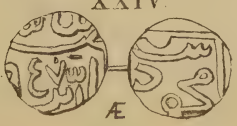

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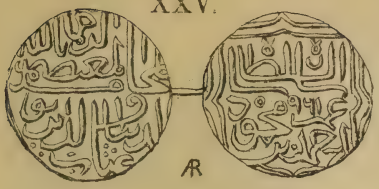

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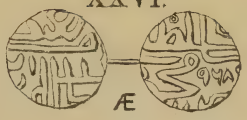

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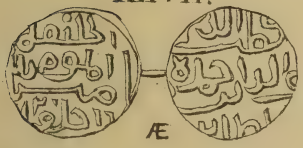

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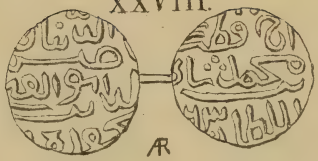

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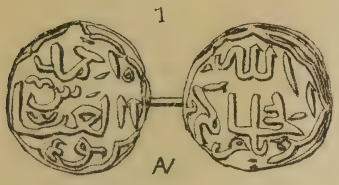
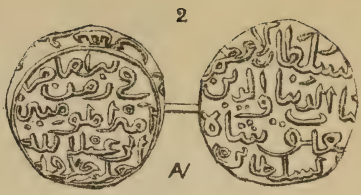
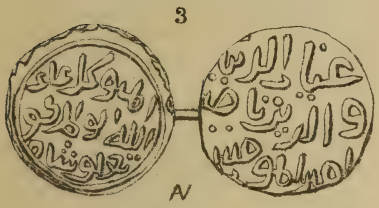
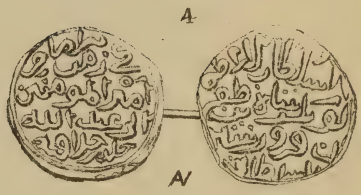
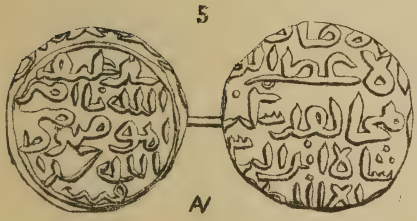
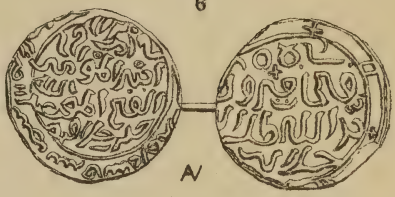


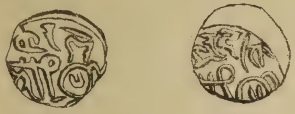



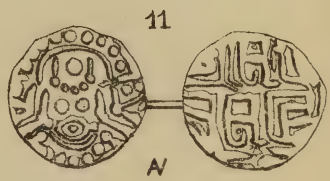



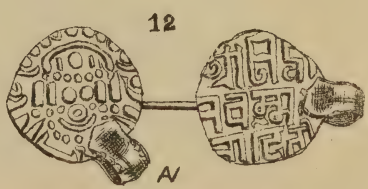



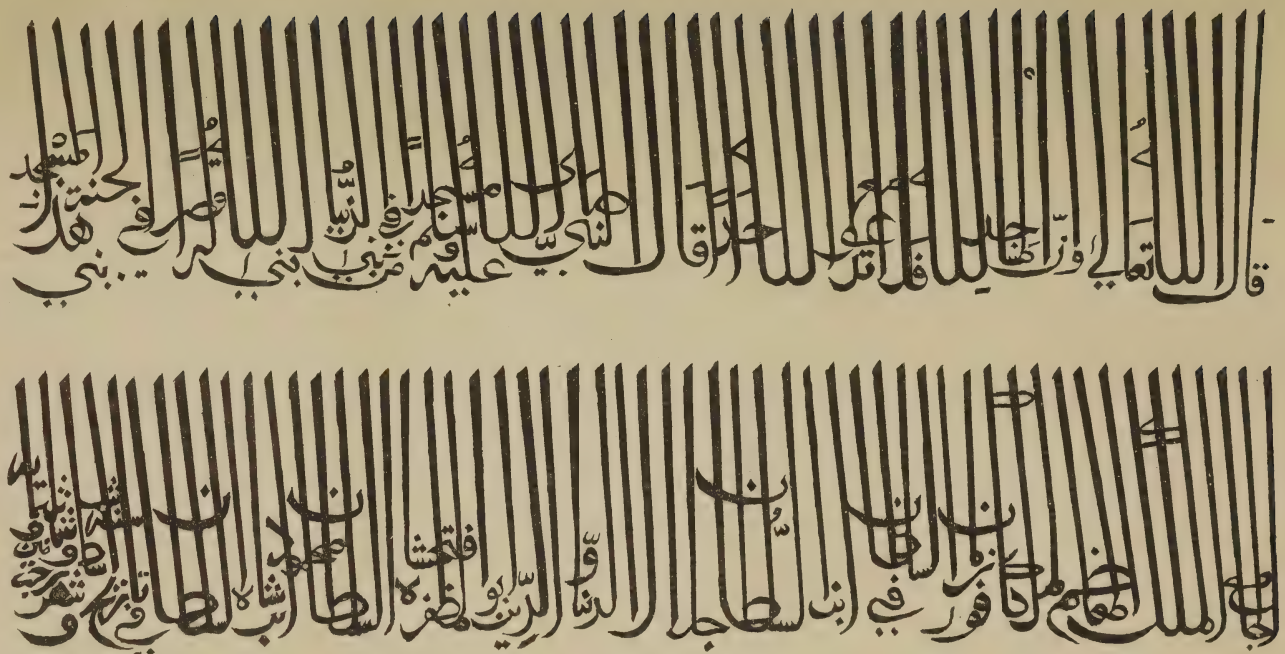






SOME NEW OR RARE HINDU AND MUHAMMADAN COINS.

LITHOGRAPHED BY A. L. PAIN, CALCUTTA, 1889.



INSCRIPTION OF JALÁLU-D-DÍN FATḤ SHÁH, DATED 888 A. H.,
IN THE MOSQUE OF ÁDAM SHAHÍD, NEAR RÁMPÁL.

LITHOGRAPHED BY A. L. PAIN, CALCUTTA, 1889.

# LIST OF MEMBERS

OF THE

# ASIATIC SOCIETY OF BENGAL.

ON THE 31ST DECEMBER 1888.

# LIST OF OFFICE-BEARERS AND MEMBERS OF COUNCIL FOR THE YEAR 1888.

---

*President.*

Lieut.-Col. J. Waterhouse, B. S. C.

*Vice-Presidents.*

E. T. Atkinson, Esq., B. A., C. S.
Rájá Rájendralála Mitra, C. I. E., LL.D.
J. Wood-Mason, Esq.

*Secretaries and Treasurer.*

J. Wood-Mason, Esq.
Dr. A. F. R. Hoernle.
Dr. W. King, B. A.

*Other Members of Council.*

D. Waldie, Esq., F. C. S.
C. H. Tawney, Esq., M. A.
Bábú Pratápa Chandra Ghosha, B. A.
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Mahámahopádhyáya Maheśchandra Nyáyaratna, C. I. E.
H. Beveridge, Esq., C. S.
W. King, Esq., B. A., D. Sc.
Nawab Abdul Latíf Bahádur, C. I. E.
A. Simson, Esq.
A. Pedler, Esq.
Dr. J. Scully.
Pandit Haraprasád Sástri, M. A.
Dr. D. D. Cunningham.

# LIST OF ORDINARY MEMBERS.

R. = Resident. N. R. = Non-Resident. A. = Absent. N. S = Non-Subscribing.
L. M. = Life Member. F. M. = Foreign Member.

N. B.—Members who have changed their residence since the list was drawn up are requested to give intimation of such a change to the *Secretaries*, in order that the necessary alteration may be made in the subsequent edition. Errors or omissions in the following list should also be communicated to the Secretaries.

Members who are about to leave India and do not intend to return are particularly requested to notify to the *Secretaries* whether it is their desire to continue members of the Society; otherwise, in accordance with Rule 40 of the Bye-Laws, their names will be removed from the list at the expiration of three years from the time of their leaving India.

| Date of Election. | | |
|---|---|---|
| 1860 Dec. 5. | R. | Abdul-Latíf, Nawab Bahádur, C. I. E. *Calcutta.* |
| 1885 Mar. 4. | R. | Abdur Rahmán, A. F. M., Barrister-at-Law. *Calcutta.* |
| 1888 Feb. 1. | F.M. | Adamson, Major Charles Henry Ellison, M. S. C., Deputy Commissioner, Bhamo. *Europe.* |
| 1860 July 4. | N.R. | Ahmad Khán, Bahádur, Hon. Sayyid, K. C. S. I. *Aligarh.* |
| 1888 April 4. | R. | Ahmud, Maulvi, Arabic Professor, Presidency College. *Calcutta.* |
| 1872 April 3. | N.R. | Ashán-ullah, Khan Bahádur, Nawáb. *Dacca.* |
| 1860 April 4. | A. | Aitchison, J. E. T., M. D., C. I. E., *Europe.* |
| 1888 Feb. 1. | N.R. | Alcock, Alfred William, M. B., Surgeon Naturalist, Marine Survey Department. |
| 1884 Mar. 5. | L.M. | Ali, Sir Ali Kadar Syud Hassan, Bahádur, K. C. I. E. *Murshedabad.* |
| 1874 June 3. | R. | Amír Ali, Syud, C. I. E., Barrister-at-Law. *Calcutta.* |
| 1888 Feb. 1. | R. | Anderson, Henry H. *Calcutta.* |
| 1865 Jan. 11. | F.M. | Anderson, John, M. D., F. R. S., L. S., *Europe.* |
| 1884 Sept. 3. | R. | Anderson, J. A. *Calcutta.* |
| 1887 June 1. | R. | Apjohn, J. H., M. I. C. E., P. W. Dept. *Calcutta.* |
| 1887 May 4. | R. | Atkinson, Rev. Augustus W., M. A., Principal, La Martiniere. *Calcutta.* |
| 1871 Sept. 6. | R. | Atkinson, Edwin Felix Thomas, B. A., C. S., Acct.-General, Bengal. *Calcutta.* |
| 1869 Feb. 3. | N.R. | Attar Singh, Bahádur, Sirdár, C. I. E., M. U. F., Chief of Bhadour. *Ludiana.* |

| Date of Election, | | |
|---|---|---|
| 1870 Feb. 2. | L.M. | Baden-Powell, Baden Henry, C. I. E., C. S., Offg. Judge, Chief Court of the Panjab. *Lahore.* |
| 1862 Feb. 5. | L.M. | Bysack, Gaurdás. *Calcutta.* |
| 1865 Nov. 7. | N.S. | Ball, Valentine, M. A., F. R. S., F. G. S. *Europe.* |
| 1862 Aug. 1. | F.M. | Barclay, Arthur, M. B., Surgeon Major, Sec. to Surgeon General and Sanitary Commissioner with the Govt. of India. *Europe.* |
| 1869 Dec. 1. | L.M. | Barker, R. A., M. D., Civil Surgeon. *Serampore.* |
| 1877 Jan. 17. | N.R. | Barman, Kishor Kumár Rádhá Dev, Juvráj of Hill Tipperah. *Tipperah.* |
| 1885 Nov. 4. | R. | Barman, Dámudar Dás. *Calcutta.* |
| 1885 Aug. 5. | A. | Barnett, John, Bengal Pilot Service. *England.* |
| 1881 Aug. 3. | N.R. | Barstow, Henry Clements, C. S., Magistrate and Collector. *Cawnpore.* |
| 1887 Aug. 3. | R. | Basu, Haricharan. *Calcutta.* |
| 1886 June 2. | F.M. | Baumgarten, Casper Wilhelm. *Batavia.* |
| 1873 Feb. 5. | R. | Bayne, R. R., M. R. I. B. A., Chief Engineer's Office, E. I. Railway. *Calcutta.* |
| 1864 Sept. 7. | N.R. | Beames, John, C. S., Commissioner, Bhaugulpur Division. *Bhaugulpur.* |
| 1878 Sept.25. | N.R. | Beighton, T. D., C. S., Judge. *Dacca.* |
| 1862 Oct. 8. | A. | Bernard, Sir Charles Edward, K. C. S. I., C. S., *Europe.* |
| 1876 Nov.15. | R. | Beveridge, Henry, C. S., District and Sessions Judge. *Alipur.* |
| 1878 Oct. 4. | R. | Bhakta, Krishna Gopál. *Calcutta.* |
| 1879 Mar. 5. | N.R. | Biddulph, Lt.-Col. J., B. S. C. Political Agent. *Deoli.* |
| 1884 Jan. 2. | N.R. | Bidie, G., Surgeon-General C. I. E., F. L. S., M. B., Belmont, Ootacamund. *Madras.* |
| 1884 Feb. 6. | N.R. | Bigg-Wither, Major A. C., B. A., A. I. C. E. *Quetta.* |
| 1885 Jan. 7. | N.R. | Bignold, T. F., C. S., Dist. and Sessions Judge. *Sooree.* |
| 1885 Mar. 4. | N.R. | Bilgrámi, Syud Ali, B. A., A. R. S. M., F. G. S. *Hyderabad* |
| 1886 Aug. 4. | N.R. | Bingham, Major Charles Thomas, B. S. C., Deputy Conservator of Forests. *Burmah.* |
| 1857 Mar. 4. | L.M. | Blanford, H. F., A. R. S. M., F. R. S., F. G. S. Meteorological Reporter, Govt. of India. *England.* |
| 1859 Aug. 3. | L.M. | Blanford, W. T., A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.* [*Pergunnahs.* |
| 1885 Mar. 4. | R. | Bolton, C. W., C. S., Magte. and Collector. 24- |
| 1880 Nov. 3. | N.R. | Bose, Pramatha Náth, B. Sc., F. G. S., Geological Survey of India. |
| 1876 Nov.15. | N.R. | Bowie, M. M. Colonel. Inspector General of Police C. P. *Nagpur.* |
| 1868 Jan. 15. | N.R. | Boxwell, John, C. S., Offg. Commr., Patna Divn. *Bankipur.* |
| 1876 May 4. | N.R. | Bradshaw, Deputy Surgeon-General A. F. M. D. *Rawal Pindi.* |

| Date of Election. | | |
|---|---|---|
| 1860 Mar. 7. | L.M. | Brandis, Sir Dietrich, K. C. I. E., C. I. E., PH. D., F. L. S., F. R. S. *Europe.* |
| 1887 May 4. | R. | Burál, Nobinchánd, Solicitor. *Calcutta.* |
| 1879 April 2. | R. | Calcutta, The Rt. Rev. the Lord Bishop of. *Calcutta.* |
| 1880 Mar. 3. | N.R. | Carlleyle, A. C., Archæological Survey of India. *Allahabad.* |
| 1881 Feb. 2. | N.R. | Carter, Philip John, Deputy Conservator of Forests. *Port Blair.* |
| 1885 April 1. | N.R. | Chambers, J. W. *Narainganj.* |
| 1881 Mar. 2. | N.R. | Channing, Francis Chorley, C. S. Divisional Judge. *Lahore.* |
| 1880 May 5. | N.R. | Chatterji, Tárá Prasáda, Deputy Magte. *Bhaugulpur.* |
| 1880 Jan. 7. | R. | Chaudhuri, Govinda Kumár. *Calcutta.* |
| 1861 Mar. 1. | N.R. | Chaudhuri, Haranchandra, Zemindar. *Sherpur Mymensingh.* |
| 1880 Nov. 3. | N.R. | Chaudhuri, Khirod Chandra Rái. Deputy Inspector of Schools, Sonthal Pergunnahs. *Nya Dumka.* |
| 1886 April 7. | N.R. | Chaudhuri, Rádhábállabha. *Sherpur, Mymensingh.* |
| 1885 Feb. 4. | N.R. | Chaudhuri, Rájá Suryakánta, Bahádur. *Mymensingh.* |
| 1885 April 1. | N.R. | Clark, H. Martyn, M. B. *Amritsar.* |
| 1877 Aug.30. | R. | Clarke, Lieut.-Col. Henry Wilberforce, R. E. *Calcutta.* |
| 1880 Aug.26. | F M. | Clerk, Lieut.-Colonel Malcolm G. *Europe.* |
| 1881 May 4. | N.R. | Cockburn, John, Asst. Sub-Deputy Opium Agent. *Karwi, Banda, N. W. P.* |
| 1888 Nov. 1. | N.R | Collett, Brigadier General, Henry, C. B., F. L. S. *Meiktala, Upper Burma.* |
| 1886 Aug.26. | F.M. | Condenhove, Count H., Attaché Austro-Hungarian Legation. *Constantinople.* |
| 1874 Nov. 4. | N.R. | Constable, Archibald, M. I. C. E. Resident Engineer and Personal Asst. to Chief Engineer, Oudh and Rohilkund Railway. *Lucknow.* |
| 1884 Aug. 6. | R. | Cotes, E. C., Indian Museum. *Calcutta.* |
| 1876 Mar. 1. | N.R. | Crawfurd, James, B. A., C. S., Barrister-at-Law, Offg. District and Sessions Judge. *Patna.* |
| 1887 Aug.25. | R. | Criper, William Risdon, F. C. S., F. I. C., A. R. S. M. *Kasipur.* |
| 1877 June 6. | R. | Croft, The Hon. Sir A. W., K. C. I. E., M. A., Director of Public Instruction, Bengal. *Calcutta.* |
| 1874 Mar. 4. | R. | Crombie, Alexander, M. D., Surgeon Major, Presidency General Hospital. *Calcutta.* |
| 1888 Dec. 5. | N R. | Crooke, William, B. A., C. S. Magistrate and Collector. *Eta.* |
| 1873 Aug. 6. | R. | Cunningham, David Douglas, Surgeon-Major. Honorary Surgeon to the Viceroy. *Calcutta.* |

| Date of Election. | | |
|---|---|---|
| 1873 Dec. 3. | N.R. | Dames, Mansel Longworth, C. S., Asst., Commissioner. *Dera Ghazi Khan.* |
| 1877 June 6. | N.R. | Darbhanga, Sir Luchmessur Sing, Bahádur, K. C. I. E., Mahárajá of. *Darbhanga.* |
| 1865 June 7. | N.R. | Dás, Rájá Jaykrishna, Bahádur, C. S. I. *Bijnor.* |
| 1879 April 7. | N.R. | Dás, Rám Saran, M. A., Secy., Oudh Commercial Bank, Limited. *Fyzabad, Oudh.* |
| 1869 April 7. | F.M. | Day, Dr. Francis, F. L. S., F. Z. S. *Europe.* |
| 1885 May 6. | N.R. | Dé, Baikuṇṭanáth, Rájá Bahádur. *Balasore.* |
| 1885 Mar. 4. | R. | Deb, Kumár Nilkrishna, Bahádur. *Calcutta.* |
| 1887 Oct. 6. | R. | Deva, Kumár Vinaya Krishna, Bahádur. *Calcutta.* |
| 1862 May 7. | N.R. | Dhanapati Singh Dughar, Raí Bahádur. *Azimganj.* |
| 1877 July 4. | R. | Diler Jang, Nawáb Syad Ashgar Ali, Khan Bahádur, C. S. I. *Calcutta.* |
| 1886 June 2. | R. | Doyle, Patrick, C. E., F. G. S., M. R. A. S. *Calcutta.* |
| 1887 Nov. 2. | N.R. | Driver, Walter Henry Parker. *Ranchi, Lohardugga.* |
| 1879 Feb. 5. | N.R. | Duthie, J. F., Director, Government Botanical Survey, Northern India. *Saharanpur.* |
| 1877 Aug.30. | N.R. | Dutt, Kedarnáth, Depy. Collector. *Cuttack.* |
| 1870 Mar. 9. | L M. | Edinburgh, H. R. H. The Duke of. *Europe.* |
| 1863 May 6. | R. | Edgar, John Ware, C. S. I., C. S. Secretary, Government of Bengal. *Calcutta.* |
| 1874 Dec. 2. | A. | Egerton, The Hon. Sir Robert Eyles, K. C. S. I., C. I. E., C. S. *Europe.* |
| 1871 Dec. 2. | N.R. | Eliot, J., M. A., Meteorological Reporter to the Govt. of Bengal. *Simla.* |
| 1886 Jan. 6. | R. | Elson, Samuel R. Bengal Pilot Service. *Calcutta.* |
| 1876 Jan. 5. | F.M | Feistmantel, Ottokar, M. D. *Europe.* |
| 1880 April 7. | N.R. | Fiddian, W., M. A., C. S., *Pubna.* |
| 1879 July 2. | R. | Finucane, M. C. S., Director of Agriculture, Bengal. *Calcutta.* |
| 1869 Sept. 1. | A. | Fisher, John Hadden, C. S. *Europe.* |
| 1886 April 7. | F.M. | Fleet, John Faithfull, C. I. E., C. S. *Europe.* |
| 1876 July 5. | N.R. | Foulkes, The Rev. Thos. F. L. S., M. R. A. S., F. R. G. S., *Salem, Madras Presy.* |
| 1869 Sept. 1. | A. | Fryer, Colonel G. E., M. S. C. *Europe.* |
| 1880 April 7. | N.R | Gajapati, Ánanda Rám, K. C. I. E., Rájá of Vizianagram. *Vizianagram.* |
| 1873 Dec. 3. | A. | Gamble, J. S., M. A., Conservator of Forests, Northern Circle, Madras. *Europe.* |
| 1883 Aug. 1. | N.R. | Garga, Kumár Isvariprasád, Zemindar. *Maisádal.* |
| 1859 Aug. 3. | L M. | Gastrell, General James Eardley *Europe.* |
| 1867 Dec. 4. | R. | Gay, E. M. A., F. R. A. S., Comptroller-General. *Calcutta.* |
| 1883 Aug.30. | R. | Ghose, Manmohan. *Calcutta.* |

| Date of Election. | | |
|---|---|---|
| 1871 May 3. | R. | Ghosha, Káliprasanna. *Calcutta.* |
| 1869 Feb. 3. | R. | Ghosha, Pratápchandra, B. A. *Calcutta.* |
| 1884 Dec. 3. | N.R. | Giles, George, M. J., M. B., F. R. C. S., Civil Surgeon. *Hoshangabad.* |
| 1886 Sept.30. | N.R. | Gimlette, George Hart Desmond, Surgeon, Bengal Medical Service, M. D., M. CH., M. R. C. S., L. S. A. Goona Political Agency. *Central India.* |
| 1861 Feb. 5. | N S. | Godwin-Austen, Lieut.-Colonel H. H., F. R. S., F. Z. S., F. R. G. S. *Europe.* |
| 1882 May 3 | R. | Golám Sarwar, Maulaví. *Calcutta.* |
| 1881 Mar. 2. | R. | Gosáin, Hem Chunder. *Calcutta.* |
| 1863 Nov. 4. | A. | Gowan, Major-General J. Y. *Europe.* |
| 1877 Nov. 7. | L.M. | Grant, Alexander, M. I. C. E. *Europe.* |
| 1876 Nov.15. | N.R. | Grierson, George Abraham, C. S. *Gya.* |
| 1885 Dec. 2. | N.R. | Griesbach, C L., C. I. E., F. G. S., Deputy Superintendent, Geological Survey of India. |
| 1861 Sept. 4. | A. | Griffin, Sir Lepel Henry, K. C. S. I., C. S. *Europe.* |
| 1861 Feb. 6. | N.R. | Growse, Frederick Salmon, C. I. E., M. A., C. S., Magistrate and Collector. *Fatehgarh, N. W.-P.* |
| 1886 Mar. 3. | N.R. | Gupta Ashootosh, C. S., Assistant Magistrate and Collector. *Beguserai, Monghyr.* |
| 1888 July 4. | R. | Gupta Rajanikánta. *Calcutta.* |
| 1883 Jan. 3. | N.R. | Harding, Francis Henry, B. A., C. S. *Chittagong.* |
| 1879 Mar. 5. | A. | Harraden, S. *Europe.* |
| 1875 Mar. 3. | N.R. | Hendley, Surgeon Major Thomas Holbein. *Jeypore.* |
| 1883 May 2. | N.R. | Hill, Samuel, Alexander, B. SC., A. R. S. M, F. C. S., Prof. of Physical Science, Muir College and Meteor. Reporter to Govt., N.-W. P. and Oudh. *Allahabad.* |
| 1872 Dec. 5. | R. | Hoernle, Rev. A. F. R., PH. D., Principal of the Calcutta Madrasa. *Calcutta.* |
| 1878 Mar. 6. | A. | Hoey, W., C. S. *Europe.* |
| 1886 June 2. | R. | Hogg, Alexander. *Calcutta.* |
| 1884 Mar. 5. | N.R. | Hooper, John, C. S., Settlement Officer. *Basti, N.-W. P.* |
| 1873 Jan. 2. | L.M | Houstoun, G. L., F. G. S. *Europe.* |
| 1863 Jan. 15. | N.R. | Howell, Mortimer Sloper, C. S. *Moradabad, N.-W. P.* |
| 1878 Sept.25 | A. | Hughes, G., C. S., Deputy Commissioner. *Europe.* |
| 1867 Aug. 7. | N.R. | Hughes, T. W. H., A. R. S. M., F. G. S., Superintendent Geol. Survey of India. |
| 1866 Jan. 17. | A. | Hughes, Major W. G., M. S. C. *Europe.* |
| 1870 Jan. 5. | N.R. | Hume, Allan Octavian, C. B., C. S. *Simla.* |
| 1884 May 2. | N.R. | Hussein, Syud, B. A., Secy. to Nizam of Hyderabad's Council. *Hyderabad.* |
| 1872 Dec. 4. | N.R. | Ibbetson, Denzil Charles Jelf, C. S. Deputy Commissioner. *Rohtak, Panjab.* |

| Date of Election. | | |
|---|---|---|
| 1866 Mar. 7. | F.M. | Irvine, William C. S., *Europe.* |
| 1884 May. 2. | N.R | Iskander Áli Mirza, Prince. *Murshedabad.* |
| 1880 Dec. 1. | N.R | Jackson, William Grierson, C. S. *Fatehpur.* |
| 1869 Aug. 4. | R. | Jahán Qadr Muhammad Wáhid Alí, Bahádur, Prince. *Garden Reach, Calcutta.* |
| 1876 July 5. | A. | Jarrad, Lieut. F. W., R. N., F. R. A. S., Marine Survey Dept. *Europe.* |
| 1879 Mar. 5. | R. | Jarrett, Lt.-Col. H. S., B. S. C., Secy. to the Board of Examiners. *Calcutta.* |
| 1881 Feb. 2. | A. | Jenkins, Major Thomas Morris, M. S. C., Deputy Commissioner, *Europe.* |
| 1867 Dec. 4. | A. | Johnstone, Col. Sir James, K. C. S. I., C. S. I. *Europe.* |
| 1873 Dec. 3. | N.R. | Johore, H. H. the Mahárájá of, K. C. S. I. *New Johore, Singapore.* |
| 1884 Aug. 6. | R. | Jones. E. J., Geol. Survey of India. *Calcutta.* |
| 1888 June 6. | R. | Kabir-ud-din Ahmad, Khán Bahádur, Shams-ul-Ulma, Maulvi. *Calcutta.* |
| 1882 Mar. 1. | N.R. | Kennedy, Pringle, M. A. *Mozufferpur.* |
| 1874 Dec. 2. | N.R. | Khudá Baksh, Khán Bahádur, Maulaví. *Bankipur.* |
| 1884 Nov. 5. | N.R. | Kitts, Eustace John, C. S. *Banda.* |
| 1867 Dec. 4. | R. | King, G. M. B, F. L. S., Supdt., Royal Botanic Garden. *Sibpur.* |
| 1881 Mar. 2. | F.M. | King, Lucas White, B. A., LL. B., C. S., Assistant Agent to the Governor General, Central India. *Europe.* |
| 1862 Jan. 15. | R. | King, W., B. A., D. SC., Director, Geol. Survey of India. *Calcutta.* |
| 1880 Jan. 7. | R. | Kisch, H. M., M. A., C. S. Post Master General, Bengal. *Calcutta.* |
| 1887 May 4. | L.M. | Lanman, Charles R. Corresponding Secretary of the American Oriental Society, Professor of Sanskrit in Harvard College. *Cambridge, Mass. U. S. America.* |
| 1877 Sep. 27. | N.R. | La Touche, James John Digges, B. A., C. S., *Menbu, Upper Burma.* |
| 1888 Feb. 1. | N.R. | Lee, William Herbert, C. S. *Cuttack.* |
| 1881 Mar. 2. | N.R. | Lee, J. Bridges, M. A., F. G. S., F. C. S., F. Z. S., Barrister-at-Law. *Lahore.* |
| 1880 July 7. | N.R. | Lewis, Rev. Arthur, B. A., *Dehra Ghazi Khan.* |
| 1886 Sep. 30. | N.R. | Luson, Hewling, C. S., Assistant Magistrate. *Gya.* |
| 1869 July 7. | N.R. | Lyall, Charles James, B. A., C. S. *Shillong.* |
| 1870 April 7. | L.M. | Lyman, B. Smith. *Philadelphia, Pa., U. S., America.* |
| 1884 Dec. 3. | N.R. | McCabe, R. B., C. S., Deputy Commissioner. *Tezpur Assam.* |
| 1868 Dec. 2. | N.R. | Macauliffe, Michael, B. A., C. S., Judicial Assistant Commissioner. *Sialkot.* |

| Date of Election. | | |
|---|---|---|
| 1886 June 2. | R. | Macdonald, A., Editor, "Englishman." *Calcutta.* |
| 1884 Mar. 5. | N.R. | Macdonnell, A. P., C. S. I., B. A., C. S., Secy., Govt. of India, Home Dept. |
| 1879 Feb. 5. | N.R. | Macgregor, Lieut.-Col. C. R., F. R. G. S., 44th N. I. *Manipur.* |
| 1848 April 5. | L.M | Maclagan, General Robert, R.E., F. R. S. E., F. R. G. S. *Europe.* |
| 1873 Dec. 3. | R. | MacLeod, Kenneth, M. D. Brigade Surgeon. *Calcutta.* |
| 1880 May 5. | N.R. | MacLeod, Roderick Henry, C. S., Asst. Magte. *Kasia, Gorakpur, N.-W. P.* |
| 1881 July 6. | R. | Mahomed Firukh Sháh, Prince. *Calcutta.* |
| 1886 Jan. 6. | N.R. | Mahomed Latif Khán, Sayyid, Khán Bahádur. *Jhang. Panjab.* |
| 1882 Aug. 2. | R. | Mahomed Yusoof, Hon. Maulaví. *Calcutta.* |
| 1888 July 4. | N.R. | Mahomed Zainool Abideen Ḳhán Bahádur Feroze Jung, Nawab Syud (Nizamut Family). *Murshedabad.* |
| 1867 April 3. | R. | Mainwaring, Major-General George Byres, S. C. *Serampur.* |
| 1878 April 3. | R. | Mallet, F. R., F. G. S., F. C. S., Superintendent, Geological Survey of India. *Calcutta.* |
| 1869 Sept. 1. | R. | Mallik, Yadulál. *Calcutta.* |
| 1880 May 5. | N.R. | Mandlik, The Hon. Ráo Sáhib Visvanáth Náráyana, C. S. I. *Bombay.* |
| 1869 July 7. | N.R. | Markham, Alexander Macaulay, C. S., F. R. G. S., Collector. *Banda.* |
| 1886 Aug. 26. | A. | Meade, Capt. Malcolm John, S. C., Assistant Agent, Governor-General. *Europe.* |
| 1860 Mar. 7. | A. | Medlicott, H. B., M. A., F. R. S., F. G. S. *England.* |
| 1886 Mar. 3. | R. | Mehtá, Roostumjee Dhunjeebhoy. *Calcutta.* |
| 1884 Nov. 5. | N.R. | Middlemiss, C. S., A. B., Assistant Superintendent, Geological Survey of India. |
| 1871 Sept. 6. | N.R. | Miles, Lieut.-Colonel S. B., S. C., Political Agent. *Udaipur.* |
| 1884 Sept. 3. | R. | Miles, William Harry. *Calcutta.* |
| 1870 July 6. | R. | Miller, A. B., B. A., Barrister-at-Law, Official Trustee. *Calcutta.* |
| 1874 May 6. | N.R. | Minchin, F. J. V. *Aska, Ganjam.* |
| 1875 Aug. 4. | A. | Minchin, Major-General, C. C. *Europe.* |
| 1856 Mar. 5. | R. | Mitra, Rájá Rájendralála, LL. D., C. I. E. *Calcutta.* |
| 1876 Dec. 6. | F.M. | Mockler, Lt.-Col. E., British Consul. *Muscat, Persian Gulf.* |
| 1886 May 5. | N.R. | Molesworth, Capt. E. H., Commandant, Police Levy, *Dibrugarh.* |
| 1883 Dec. 12. | N.R. | Möller, Otto Chrestien. *Tukvar, Darjeeling.* |
| 1881 May 4. | N.R. | Molloy, Lieut.-Col. Edward 5th Goorkhas. *Abbottabad, Hazara, Panjab.* |
| 1864 Nov. 2. | N.R. | Muir, J. W., M. A., C. S. *Azimgarh.* |

| Date of Election. | | |
|---|---|---|
| 1879 May 7. | R. | Mukerjea, Bhudeva, C. I. E. *Calcutta.* |
| 1867 Mar. 6. | R. | Mukerjea, Rájá, The Hon. Pearimohan, C. S. I., M. A. *Uttarpara.* |
| 1885 July 1. | R. | Mukerjea, Nilmani, Professor, Sanskrit College. *Calcutta.* |
| 1886 May 5. | R. | Mukhopádhyáya, Asutosh, M. A., F. R. A. S., F. R S. E. *Calcutta.* |
| 1887 May 4. | R. | Munro, Thomas R., Port Commissioners Department. *Calcutta.* |
| 1885 June 3. | N.R. | Naemwoollah, Maulaví, Depy. Magte. *Bulandshahr.* |
| 1887 June 1. | N.R. | Narain, Ráo Govind Ráo. *Allahabad.* |
| 1876 May 4. | R. | Nash, A. M., M. A., Inspector of European Schools, Bengal. *Calcutta.* |
| 1881 Nov. 2. | R. | Nicéville, L. de., F. E. S. *Calcutta.* |
| 1887 April 6. | R. | Noetling, Fritz. Ph. D. Palæontologist to the Geological Survey of India. *Calcutta.* |
| 1869 July 7. | N.R. | Nursing Ráo, A. V., F. R. A. S., Ráo Bahádur. *Vizagapatam.* |
| 1885 Feb. 4. | R. | Nyáyaratna, Pandit Mahámahopádhyáya Maheschandra. *Calcutta.* |
| 1879 Aug. 28. | N.R. | Oldham, Brigade-Surgeon C. F., F. R. G. S. *Dharamsalla.* |
| 1883 Dec. 1. | N.R. | Oldham, R. D., A. R. S. M., F. G. S., Deputy Superintendent, Geol. Sur. of India. |
| 1883 Aug. 30. | N.R | Oliver, Edw. Emmerson, M. I. C. E., Under-Secy. to Govt. Panjab, P. W. D. *Lahore.* |
| 1885 Feb. 4. | N.R. | Oliver, James William, Forest Dept. *Tharrawaddy, Burmah.* |
| 1887 July 6. | R. | Oung, Moung Hla, Financial Department, Government of India. *Calcutta.* |
| 1880 Aug. 4. | L.M. | Pandia, Pandit Mohanláll Vishnuláll, F. T. S., Member and Secy., Royal Council of Meywar. *Udaipur.* |
| 1888 Feb. 1. | L.M. | Pandit, Hon. Ajodhianath. *Allahabad.* |
| 1880 Jan. 7. | N.R. | Pargiter, Frederick E., B. A., C. S. *Pubna.* |
| 1880 Jan. 7. | N.R. | Parry, J. W., C. E., ASSOC. M. I. C. E., Asst. Engineer. *Western Bengal Surveys.* |
| 1862 May 7. | L.M. | Partridge, Samuel Bowen, M. D. Surgeon-Major. *Europe.* |
| 1871 Dec. 6. | N.R. | Peal, S. E. *Sibsagar, Assam.* |
| 1860 Feb. 1. | F.M. | Pearse, General Geo. Godfrey, C. B., R. H. A., Godfrey Housè. *Cheltenham, England.* |
| 1873 Aug. 6. | R. | Pedler, Alexander, F. C. S., Professor of Chemistry, Presidency College. *Calcutta.* |
| 1888 June 6. | L.M. | Pennell, Aubray Percival, B. A., C. S. *Cuttack.* |
| 1865 Sept. 6. | N.R. | Peppé, T. F. *Shahabad.* |

| Date of Election. | | |
|---|---|---|
| 1881 Aug.25. | R. | Percival, Hugh Melvile, M. A., Professor, Presidency College. *Calcutta.* |
| 1877 Aug: 1. | N.R. | Peters, C. T., M.B , Surgeon-Major. *Bijapur, Bombay.* |
| 1888 July 4. | R. | Petley, Lieut.-Eaton W. R. N., F. R. G. S., Port Officer. *Calcutta.* |
| 1887 Mar. 2. | R. | Pope, T. Archdale, Assistant Superintendent, Survey of India Department. *Calcutta.* |
| 1881 Feb. 2. | N.R. | Prideaux, Lieut-Colonel William Francis, B. S. C. Resident. *Jeypur.* |
| 1880 April 7. | N.R. | Rai, Bipina Chandra, B. L. *Rungpore.* |
| 1887 May 4. | R. | Ráy, Prasannakumár, D. Sc., (Lond. and Edin.) Professor, Presidency College, Registrar, Calcutta University. *Calcutta.* |
| 1880 Aug. 4. | A. | Reynolds, Herbert William Ward, C. S. *Europe.* |
| 1884 Mar. 5. | N.R. | Risley, H. H., B. A., C. S. *Darjeeling.* |
| 1860 Jan. 3. | N.R. | Rivett-Carnac, John Henry, C. I. E., F. S. A., C. S., Opium Agent. *Ghazipur.* |
| 1865 Feb. 1. | A. | Robinson, S. H. *Europe.* |
| 1888 July 4. | N.R. | Roy, Kirán Chándrá, Zemindar. *Narail, Jessore.* |
| 1888 June 6. | R. | Roy, Kumár Denendro Nárayán. *Calcutta.* |
| 1881 Aug.30. | N.R. | Roy, Nanda Kumár. *Giridhi.* |
| 1888 June 6. | R. | Roy, Peary Mohun. *Calcutta.* |
| 1888 Sep. 27. | N.R. | Roy, Upendra Chándra, Zemindar. *Narail, Jessore.* |
| 1885 Mar. 4. | R. | Rustomjee, H. M. *Calcutta.* |
| 1880 Sep. 30. | N.R. | Sage, E. M., Ex. Engineer, P. W. D. *Tounghu.* |
| 1887 June 1. | N.R. | Sandberg, Rev. Graham, B. A., Barrister-at-Law, Inner Temple. Chaplain. *Jhansi.* |
| 1877 May 2. | R. | Sandford, W. *Calcutta.* |
| 1872 Dec. 4. | R. | Sarasvati, Pandit, Pránnáth, M. A., B. L. *Bhowanipur.* |
| 1867 April 3. | R. | Sarkár, The Hon. Dr. Mahendralál, C. I. E. *Calcutta.* |
| 1885 Mar. 4. | R. | Sarvádhikári, Rájakumár. *Calcutta.* |
| 1885 Feb. 4. | R. | Sástri, Haraprasád, M. A. *Calcutta.* |
| 1870 May 4. | A. | Schlich, Dr. W. *Europe.* |
| 1888 Feb. 1. | R. | Sclater, William Lutley, Deputy Superintendent, Indian Museum. *Calcutta.* |
| 1884 April 2. | N.R. | Scotland, John Parry, C. E., Ex. Engineer. *Midnapur.* |
| 1874 July 1. | R. | Scully, Dr. John. *H. M.'s Mint, Calcutta.* |
| 1888 Sept. 27. | R. | Sen Gupta, Kali Prasanna. *Calcutta.* |
| 1886 Mar. 3. | N.R. | Sen, Hirálal, Excise Department. *Mozufferpur.* |
| 1885 April 1. | N.R. | Sen, Yadunáth. *Khurda, Puri.* |
| 1885 April 1. | R. | Sen, Narendranáth. *Calcutta.* |
| 1879 Jan. 8. | N.R. | Sewell, R., M. C. S. *Madras* |
| 1879 May 7. | A. | Sheridan, C. J., C. E. *Europe.* |
| 1888 April 4. | N.R. | Shástri, Haridas Bhattáchárya, Sankhya Shastri, M. A. Director of Public Instruction, Jaypur State. *Jaypur.* |

| Date of Election. | | |
|---|---|---|
| 1882 May 3. | N.R. | Shyamaldáss, Mahámahopádhyáya Kaviráj, Private Secy. to H. H. the Mahárána of Udaipur. *Udaipur.* |
| 1878 April 3. | R. | Simson, A. *Calcutta.* |
| 1887 April 6. | R. | Simpson, Dr. W. J., Health Officer to the Municipal Corporation. *Calcutta.* |
| 1884 Sept. 3. | R. | Singh, Kumár Indrachandra, of Paikparah. *Calcutta.* |
| 1853 Dec. 7. | N.R. | Singh, Mahárájá Isvariprashád, C. S. I. *Benares.* |
| 1885 April 1. | R. | Singh, Kumár Saratchunder. *Calcutta.* |
| 1882 June 7. | N.R. | Singh, Mahárájá Kumár Harendra Kishore. *Bettiah.* |
| 1878 Oct. 4. | N.R. | Singh, Rájá Lachman. *Bulandshahr.* |
| 1882 Aug. 2. | N.R. | Singh, Narain, Rájá Rám. *Khyrah, Monghyr.* |
| 1880 June 2. | N.R. | Singh, Thákur Garuradhawaya Prasád, Rájá of Beswan, Beswan Fort. *Aligarh.* |
| 1859 Aug. 3. | R. | Siñha, Baláichánd. *Calcutta.* |
| 1872 Aug. 5. | N.R. | Skrefsrud, Rev. L. O., Indian Home Mission to the Santháls. *Rampur Hát.* |
| 1885 Nov. 4. | F.M. | Smith, N. F. F. *England.* |
| 1874 June 3. | A. | Smith, Vincent Arthur, C. S., Settlement Officer. *England.* |
| 1872 July 3. | N.R. | Stephen, Carr, B. L., Judl. Asst. Commr. *Amritsar.* |
| 1879 Oct. 2. | N.R. | Sterndale, R. A., F. R. G. S., Asst. Commr. of Currency. *Madras.* |
| 1882 May 3. | A. | Stewart, H. E. Sir Donald M., Bart., G. C. B., G. C. S. I. *Europe.* |
| 1876 Aug. 2. | N.R. | St. John, Lieut.-Col. Sir Oliver Beauchamp, R. E., K. C. S. I., Resident in Mysore and Chief Commissioner. *Coorg.* |
| 1880 Nov. 3. | A. | Sturt, Lieut. Robert Ramsay Napier, B. S. C., Panjab Frontier Force. *Europe.* |
| 1884 Mar. 5. | N.R. | Swinhoe, Lieut.-Col. C., B. S. C., Asst. Comy. Genl. *Poona.* |
| 1864 Aug. 11. | R. | Swinhoe, W., Attorney-at-Law. *Calcutta.* |
| 1880 Nov. 3. | A. | Swynnerton, Rev. Charles. *England.* |
| 1868 June 3. | R. | Tagore, The Hon. Mahárájá Jotendra Mohun, K.C.S.I. *Calcutta.* |
| 1865 Sept. 6. | A. | Tawney, C. H., C. I. E., M. A., Principal, Presidency College. *Europe.* |
| 1874 Mar. 4. | A. | Taylor, Commander A. D., late Indian Navy. *Europe.* |
| 1884 May 5. | N.R. | Taylor, W. C., Settlement Officer. *Khurda, Orissa.* |
| 1878 June 5. | N.R. | Temple, Capt. R. C., S. C. *Palace, Mandalay, Upper Burma.* |
| 1876 Feb. 2. | A. | Tennant, Major-General James Francis, R. E., C. I. E., F. R. S. *Europe.* |
| 1875 June 2. | N.R. | Thibaut, Dr. G., Professor, Muir Central College. *Allahabad.* |

| Date of Election. | | |
|---|---|---|
| 1886 Aug. 4. | R. | Thomas, Robert Edmond Skyring. *Calcutta.* |
| 1886 Jan. 6. | A. | Thomson, Colonel, W. B., B. S. C. *Europe.* |
| 1847 June 2. | L.M. | Thuillier, Major-Genl. Sir Henry Edward Landor, R. A., C. S. I., F. R. S. *Europe.* |
| 1883 June 6. | N.R. | Toker, Lieut.-Col Alliston Champion, B. S. C., C. B., Sec., Govt. of India, Military Dept. |
| 1871 April 5. | F.M. | Trefftz, Oscar. *Europe.* |
| 1861 June 5. | L.M. | Tremlett, James Dyer, M. A., C. S., Judge, Chief Court. *Lahore.* |
| 1872 July 3. | A. | Trevor, Colonel William Spottiswoode, R E., *Europe.* |
| 1885 May 6. | R. | Verdeau, Ivan. *Calcutta.* |
| 1886 Sep. 30. | N.R. | Waddell, Dr. Laurence Austine, M. B., Superintendent of Vaccination. *Darjeeling.* |
| 1865 Nov. 1. | R. | Waldie, David, F. C. S. *Calcutta.* |
| 1865 May 3. | R. | Waterhouse, Lt.-Col. James, B. S. C., Dy. Supdt., Survey of India. *Calcutta.* |
| 1887 Oct. 6. | N.R. | Watson, Lieut. Edward Yerbury, Deputy Assistant Commissary General. *Madras.* |
| 1874 July 1. | N.R. | Watt, Dr. George, C. I. E., Reporter on Economic Products. *Simla.* |
| 1869 Sept. 1. | N.R. | Westland, Hon. James, C. S , Financial Member of the Governor General's Council. |
| 1878 Aug. 29. | A. | Whittall, R., Forest Dept. *Europe.* |
| 1880 Feb. 4. | R. | Wilson, The Hon. Arthur, Judge, High Court. *Calcutta.* |
| 1878 Mar. 6. | N.R. | Wilson, J., C. S., Deputy Commissioner. *Sháhpur, Panjab.* |
| 1870 Jan. 5. | R. | Wood-Mason, James. *Calcutta.* |
| 1873 Aug. 6. | A. | Woodthorpe, Lieut.-Col. Robert Gossett, R. E., C. B., Deputy Supdt., Survey of India. *Europe.* |

## SPECIAL HONORARY CENTENARY MEMBERS.

| Date of Election. | |
|---|---|
| 1884 Jan. 15. | James Prescott Joule, Esq., LL. D., F. R. S. *Manchester.* |
| 1884 Jan. 15. | Dr. Ernst Haeckel, Professor in the University of *Jena.* |
| 1884 Jan. 15. | Charles Meldrum, Esq., M. A., F. R. S. *Mauritius.* |
| 1884 Jan. 15. | A. H. Sayce, Esq., Professor of Comp. Philology. *Oxford.* |
| 1884 Jan. 15. | M. Emile Senart, Member of the Institute of France. *Paris.* |
| 1884 Jan. 15. | Sir Monier Monier Williams, *Knt.*, K. C. I. E., C. I E, M.A., D. C. L., LL. D., Boden Prof. of Sanskrit. *Oxford.* |

## HONORARY MEMBERS.

| | |
|---|---|
| 1848 Feb. 2. | Sir J. D. Hooker, K. C. S. I., C. B., M. D., D. C. L., F. R. S., F. G. S. *Kew.* |
| 1853 April 6. | Major-General H. C. Rawlinson, K. C. B., D. C. L., F. R. S. *London.* |
| 1858 July 6. | B. H. Hodgson. *Europe.* |
| 1860 Mar. 7. | Professor Max Müller. *Oxford.* |
| 1860 Nov. 7. | Dr. Aloys Sprenger. *Heidelberg.* |
| 1860 Nov. 7. | Dr. Albrecht Weber. *Berlin.* |
| 1868 Feb. 5. | Major-General Sir A. Cunningham, R. E., K. C I. E., C. S. I., C. I. E. *Europe.* |
| 1868 Feb. 5. | Professor Bápu Deva Sástri. *Benares.* |
| 1872 May 1. | Sir G. B. Airy, K. C. B., M. A., D. C. L., LL. D., F. R. S. *London.* |
| 1872 June 5. | Prof. T. H. Huxley, LL. D., PH. D., F. R. S., F. G. S., F. Z. S., F. L. S. *London.* |
| 1875 Nov. 3. | Dr. O. Böhtlingk. *Leipzig.* |
| 1875 Nov. 3. | Prof. J. O. Westwood. *Oxford.* |
| 1876 April 5. | Col. H. Yule, R. E., C. B. *London.* |
| 1876 April 5. | Dr. Werner Siemens. *Berlin.* |
| 1879 June 4. | Prof. E. B. Cowell, D. C. L. *Cambridge.* |
| 1879 June 4. | Dr. A. Günther, V. P. R. S. *London.* |
| 1879 June 4. | Dr. J. Janssen. *Paris.* |
| 1879 June 4. | Prof. H. Milne-Edwards. *Paris.* |
| 1879 June 4. | Prof. P. Regnaud. *Lyons.* |
| 1879 June 4. | E. Renan. *Paris.* |
| 1881 Dec. 7. | Professor Hermann L. F. Helmholtz. *Berlin.* |
| 1881 Dec. 7. | Dr. Rudolph v. Roth. *Tübingen.* |
| 1881 Dec. 7. | Sir William Thomson, Knt., LL. D., F. R. S., F. R. S. E. *Glasgow.* |
| 1881 Dec. 7. | Professor William Wright, LL. D. *Cambridge.* |
| 1883 Feb. 7. | W. T. Blandford, A. R. S. M., F. R. S., F. G. S., F. R. G. S., F. Z. S. *London.* |
| 1883 Feb. 7. | Alfred Russell Wallace, F. L. S., F. R. G. S. *Godalming.* |
| 1883 Feb. 7. | Prof. William Dwight Whitney. *Newhaven, Connecticut,* U. S. |

## CORRESPONDING MEMBERS.

| Date of Election. | |
|---|---|
| 1844 Oct. 2. | Macgowan, Dr. J. *Europe.* |
| 1856 July 2. | Krämer, A. von. *Alexandria.* |
| 1856 ,, 2. | Porter, Rev. J. *Belfast.* |
| 1860 Feb. 1. | Baker, The Rev. H. *E. Malabar.* |
| 1861 July 3. | Gösche, Dr. R. *Berlin.* |
| 1862 Mar. 3. | Murray, A. Esq. *London.* |
| 1866 May 7. | Schlagintweit, Prof. E. von. *Berlin.* |

## ASSOCIATE MEMBERS.

| | |
|---|---|
| 1874 April 1. | Lafont, Rev. Fr. E., S. J., C. I. E. *Calcutta.* |
| 1875 Dec. 1. | Bate, Rev. J. D. *Allahabad.* |
| 1875 ,, 1. | Maulaví Abdul Hai, Madrasah. *Calcutta.* |
| 1882 June 7. | Giles, Herbert, Esq. *Europe.* |
| 1883 Feb. 7. | Rodgers, C. J. *Amritsar.* |
| 1884 Aug. 6. | Moore, F., F. R. S., F. L. S. *London.* |
| 1885 Dec. 2. | Dr. A. Führer. *Lucknow.* |
| 1886 Dec. 1. | Bábú Saratchandra Dás, C. I. E. *Darjeeling.* |

## LIST OF MEMBERS WHO HAVE BEEN ABSENT FROM INDIA THREE YEARS AND UPWARDS.*

* *Rule* 40.—After the lapse of 3 years from the date of a member leaving India, if no intimation of his wishes shall in the interval have been received by the Society, his name shall be removed from the List of Members.

The following members will be removed from the next member list of the Society under the operation of the above Rule:

Col. G. E. Fryer, M. S. C.
Major-Genl. J. Y. Gowan.
S. Harraden, Esq.
Lieut. J. W. Jarrad, R. N.
Col. Sir James Johnstone.
Major-Genl. C. C. Minchin.
S H. Robinson, Esq.
Dr. W. Schlich.
H. E. Sir D. M. Stewart, Bart.
Commander A. D. Taylor.
Major-Genl. J. T. Tenant, R. E.
Col. W. S. Trevor, R. E.

## LOSS OF MEMBERS DURING 1888.

### By Retirement.

Major E. Gowan.
F. W. Peterson, Esq.
W. Trego Webb, Esq.
F. J. E. Spring, Esq.
E. T. Mondy, Esq.
F. C. Barnes, Esq.
J. G. Delmerick, Esq.
W. D. Blyth, Esq., C. S.
B. L. Gupta, Esq., C. S.
C. A. Hackett, Esq.
Major H. H. Cole, R. E.
R. C. Laughlin, Esq.
Capt. E. R. Shopland, I. M.
Capt. R. H. C. Tufnell, M. S. C.

---

### By Death.

*Ordinary Members.*

F. Fedden, Esq.
S. S. Jones, Esq , C. S.
J. Hart, Esq.
J. MacDonald, Esq., C. E.
Surgeon-Major J. J. Monteath.

*Corresponding Members.*

Professor Holmboe.

### By Removal.

*Under Rule* 38.

Sirdár Gurdyál Sing.
Rev. A. E. Medlicott.

*Under Rule* 40.

Sir R. Temple.
Brigade Surgeon W. H. Kirton.
Col. J. W. H. Johnstone.
Rev. J. Robertson.
T. H. Pellew, Esq., C. S.
Surgeon-Major H. Cayley.
Surgeon-Major T. R. Lewis.

[APPENDIX.]

# ABSTRACT STATEMENT

OF

# RECEIPTS AND DISBURSEMENTS

OF THE

## ASIATIC SOCIETY OF BENGAL

FOR

## THE YEAR 1888.

# STATEMENT

## *Asiatic Society*

### Dr.

| | | | | | |
|---|---|---|---|---|---|
| **To Establishment.** | | | | | |
| Salaries ... ... ... | Rs. | 3,772 | 7 | 6 | |
| Commission ... ... ... | ... | 368 | 3 | 1 | |
| | | 4,140 | 10 | 7 | |
| **To Contingencies.** | | | | | |
| Stationery ... ... ... | ... | 79 | 5 | 9 | |
| Lighting ... ... ... | ... | 57 | 8 | 0 | |
| Building ... ... ... | ... | 3,929 | 8 | 1 | |
| Taxes ... ... ... | .. | 761 | 4 | 0 | |
| Postage ... ... ... | ... | 732 | 1 | 9 | |
| Freight ... ... ... | ... | 7 | 13 | 0 | |
| Meetings ... ... ... | ... | 90 | 12 | 0 | |
| Miscellaneous ... ... ... | ... | 153 | 3 | 7 | |
| | | 5,811 | 8 | 2 | |
| **To Library and Collections.** | | | | | |
| Books ... ... ... | ... | 2,220 | 4 | 10 | |
| Local periodicals ... ... ... | ... | 47 | 0 | 0 | |
| Binding ... ... ... | ... | 613 | 4 | 6 | |
| Coins ... ... ... | ... | 250 | 0 | 0 | |
| | | 3,130 | 9 | 4 | |
| **To Publications.** | | | | | |
| Journal, Part I ... ... ... | ... | 876 | 8 | 0 | |
| Journal, Part II ... ... ... | ... | 3,107 | 4 | 2 | |
| Proceedings ... ... ... | ... | 669 | 7 | 0 | |
| | | 4,653 | 3 | 2 | |
| To Printing charges of circulars, &c. ... | ... | 95 | 11 | 0 | |
| To Extraordinary charges, Miscellaneous | ... | 101 | 9 | 6 | 17,933 3 9 |
| To Personal Account (Written off and miscellaneous) | | | | | 338 11 6 |
| **To Extraordinary Expenditure.** | | | | | |
| Iron railings ... ... ... | ... | ... | | | 3,450 0 0 |
| To Balance... | ... | ... | | | 1,38,032 4 10 |
| Total Rs. | ... | ... | | | 1,59,754 4 1 |

Examined and found correct.

Meugens and King,

*Public Accountants,*

*January 30th*, 1889.

No 1.

*of Bengal.*

## Cr.

| | | | | | |
|---|---|---|---|---|---|
| By Balance from last report ... ... ... ... | | | | Rs. | 1,42,735 12 7 |
| By Cash Receipts. | | | | | |
| Publications sold for cash ... ... | Rs. | 724 | 10 | 11 | |
| Interest on investments ... ... ... | | 6,594 | 7 | 7 | |
| Advances recovered ... ... ... | | 1 | 3 | 0 | |
| Sale proceeds of old beams ... ... ... | | 112 | 0 | 0 | |
| Miscellaneous ... ... ... ... | | 82 | 2 | 0 | |
| | | 7,514 | 7 | 6 | |
| By Personal Account. | | | | | |
| Admission fees ... ... ... ... | | 592 | 0 | 0 | |
| Compounding fees ... ... ... | | 700 | 0 | 0 | |
| Subscriptions ... ... ... ... | | 7,590 | 0 | 0 | |
| Sales on credit ... ... ... ... | | 250 | 12 | 0 | |
| Miscellaneous ... ... ... ... | | 371 | 4 | 0 | |
| | | 9,504 | 0 | 0 | |
| Total income ... ... | | | | | 17,018 7 6 |
| Total Rs. ... ... | | | | | 1,59,754 4 1 |

Will. King,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# STATEMENT

## *Oriental Publication Fund in Account with*

### Dr.

To Cash Expenditure.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Printing charges ... ... ... | | | | Rs. | 9,436 | 5 | 0 | | |
| Editing charges ... ... ... | | | | ... | 5,211 | 8 | 0 | | |
| Copying ... ... ... | | | | ... | 33 | 11 | 6 | | |
| Salaries ... ... ... | | | | ... | 1,404 | 11 | 0 | | |
| Advertising ... ... ... | | | | ... | 110 | 0 | 0 | | |
| Freight ... ... ... | | | | ... | 40 | 0 | 0 | | |
| Stationery ... ... ... | | | | ... | 28 | 2 | 0 | | |
| Postage ... ... ... | | | | ... | 990 | 8 | 9 | | |
| Contingencies ... ... ... | | | | ... | 38 | 3 | 9 | | |
| Commission on collecting bills | | | | ... | 59 | 15 | 1 | | |
| | | | | | 17,353 | 1 | 1 | | |
| To Personal Account (Written off and miscellaneous) | | | | | 42 | 9 | 0 | | |
| | Total expenditure | | | ... | | ... | | 17,395 | 10 1 |
| To Balance ... ... ... | | | | | | ... | | 7,713 | 11 4 |
| | | | | Total Rs. | | ... | | 25,109 | 5 5 |

Examined and found correct.

Meugens and King,

*Public Accountants,*

*January 30th*, 1889..

# No. 2.

## *the Asiatic Society of Bengal.*

### Cr.

| | | | | |
|---|---|---|---|---|
| By Balance from last report ... ... ... | | Rs. | | 12,368 2 6 |
| By Cash Receipts. | | | | |
| Government allowance .. ... | Rs. | 9,000 0 0 | | |
| Publications sold for cash ... ... | ... | 995 1 8 | | |
| Advances recovered ... ... | ... | 118 3 6 | | |
| Interest on investments ... ... | ... | 200 0 0 | | |
| | | 10,313 5 2 | | |
| By Personal Account. | | | | |
| Sales on credit ... ... ... | ... | 2,358 2 3 | | |
| Miscellaneous ... ... ... | ... | 69 11 6 | | |
| | | 2,427 13 9 | | |
| Total income ... | | ... | | 12,741 2 11 |
| Total Rs.... | | ... | | 25,109 5 5 |

Will. King,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# STATEMENT

## *Sanskrit Manuscript Fund in Account with*

### Dr.

| | | | | | |
|---|---|---|---|---|---|
| To Cash Expenditure. | | | | | |
| Salaries ... ... ... | Rs. | 1,445 0 0 | | | |
| Travelling expenses ... ... ... | ... | 32 12 0 | | | |
| Commission ... ... ... | ... | 4 10 0 | | | |
| Freight ... ... ... ... | ... | 5 0 0 | | | |
| Postage ... ... ... ... | ... | 7 8 6 | | | |
| Contingencies ... ... ... | ... | 8 1 6 | | | |
| Stationery ... ... ... ... | ... | 4 4 0 | | | |
| | | | | 1,507 | 4 0 |
| To Balance ... | ... | | | 3,442 | 1 0 |
| Total Rs. ... | | | | 4,949 | 5 0 |

Examined and found correct.

Meugens and King,

*Public Accountants,*

*January 30th,* 1889.

No. 3.

*the Asiatic Society of Bengal.*

Cr.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| By Balance from last report ... | ... | ... | | Rs. | | 1,715 | 5 0 |
| By Cash Receipts. | | | | | | | |
| Government allowance ... | ... | Rs. | 3,200 | 0 | 0 | | |
| Publications sold for cash ... | ... | ... | 16 | 0 | 0 | | |
| | | | 3,216 | 0 | 0 | | |
| By Personal Account. | | | | | | | |
| Publications sold on credit ... | ... | ... | 18 | 0 | 0 | | |
| | Total income ... | | | ... | | 3,234 | 0 0 |
| | | Total Rs. | | ... | | 4,949 | 5 0 |

Will. King,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# STATEMENT

## *Personal*

### Dr.

| | | | | |
|---|---|---|---|---|
| To Balance from last report ... ... ... | Rs. | | 1,409 | 11 5 |
| To Cash Expenditure. | | | | |
| Advances for purchase of Sanskrit MSS., postage of books to members ... ... Rs. | ... | | 3,186 | 13 7 |
| To Asiatic Society ... ... ... | 9,504 | 0 0 | | |
| To Oriental Publication Fund ... ... | 2,427 | 13 9 | | |
| To Sanskrit MSS. Fund ... ... ... | 18 | 0 0 | | |
| | | | 11,949 | 13 9 |
| Total Rs. ... | | | 16,546 | 6 9 |

Examined and found correct.

Meugens and King,

*Public Accountants,*

30*th January*, 1889.

# No. 4.

## *Account.*

### Cr.

| | | | | | | |
|---|---|---|---|---|---|---|
| By cash receipts ... ... | Rs. | 12,774 | 6 | 1 | | |
| By Asiatic Society .. ... | ... | 338 | 11 | 6 | | |
| By Oriental Publication Fund ... | ... | 42 | 9 | 0 | | |
| | | | | | 13,155 | 10 7 |

| By Balances. | Due to the Society. | | | Due by the Society. | | | | |
|---|---|---|---|---|---|---|---|---|
| Members ... | 5,332 | 14 | 5 | 218 | 11 | 11 | | |
| Subscribers ... | 42 | 11 | 6 | 59 | 9 | 6 | | |
| Employees ... | 30 | 0 | 0 | 250 | 0 | 0 | | |
| Agents ... | 116 | 8 | 6 | 1,568 | 1 | 10 | | |
| Miscellaneous ... | 160 | 15 | 0 | 195 | 14 | 0 | | |
| | 5,683 | 1 | 5 | 2,292 | 5 | 3 | 3,390 | 12 2 |
| Total Rs. ... | | | | | | | 16,546 | 6 9 |

WILL. KING,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# STATEMENT

*Invest-*

## Dr.

| | Nominal. | Actual. |
|---|---|---|
| To Balance from last report ... ... | Rs. 1,56,300 0 0 | 1,55,820 9 10 |
| To cash ... ... ... ... | ... | 31 4 4 |
| Total Rs. | ... 1,56,300 0 0 | 1,55,851 14 2 |

Examined and found correct.
MEUGENS AND KING,
*Public Accountants,*
30*th January*, 1889.

| Funds. | Actual. | | Total. |
|---|---|---|---|
| | Permanent. | Temporary. | |
| Asiatic Society ... | 1,33,000 0 0 | 2,823 2 2 | 1,35,823 2 2 |
| O. P. Fund..... | ..... | 7,000 0 0 | 7,000 0 0 |
| Sans. MSS. ... .. | ..... | 2,000 0 0 | 2,000 0 0 |
| Trust Fund ..... | 1,100 0 0 | ..... | 1,100 0 0 |
| | 1,34,100 0 0 | 11,823 2 2 | 1,45,923 0 0 |

# STATEMENT

*Trust*

## Dr.

| | | |
|---|---|---|
| To Balance (Servants Pension Fund) ... ... | Rs. | 1,161 3 10 |
| Total Rs. | ... | 1,161 3 10 |

Examined and found correct.
MEUGENS AND KING,
*Public Accountants,*
30*th January*, 1889.

## No. 5.

*ment.*

Cr.

| | | Nominal. | | | Actual. | | |
|---|---|---|---|---|---|---|---|
| By cash ... ... ... | Rs. | 10,000 | 0 | 0 | 9,928 | 12 | 0 |
| By balance* ... ... ... | ... | 1,46,300 | 0 | 0 | 1,45,923 | 2 | 2 |
| Total Rs. | ... | 1,56,300 | 0 | 0 | 1,55,851 | 14 | 2 |

WILL. KING,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

## No. 6.

*Fund.*

Cr.

| | | | | | | |
|---|---|---|---|---|---|---|
| By balance from last report ... ... ... | Rs. | 1,111 | 3 | 10 |
| By interest on investments ... ... ... ... | | 50 | 0 | 0 |
| Total Rs ... | | 1,161 | 3 | 10 |

WILL. KING,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# STATEMENT

## *Cash*

### Dr.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| To balance from last report ... | ... | ... | ... | Rs. | 700 | 2 | 8 |
| | RECEIPTS. | | | | | | |
| To Asiatic Society ... | ... | ... | ... | ... | 7,514 | 7 | 6 |
| To O. P. Fund ... ... | ... | ... | ... | ... | 10,313 | 5 | 2 |
| To Sanskrit Manuscript Fund | ... | ... | .. | | 3,216 | 0 | 0 |
| To Personal Account ... | ... | ... | ... | ... | 12,774 | 6 | 1 |
| To Trust Fund ... ... | ... | ... | ... | ... | 9,928 | 12 | 0 |
| To Investments ... ... | ... | ... | ... | ... | 50 | 0 | 0 |
| | | Total Rs. | | ... | 44,497 | 1 | 5 |

Examined and found correct.
MEUGENS AND KING,
*Public Accountants,*
30*th January*, 1889.

# STATEMENT

## *Balance*

### Dr.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| To Cash ... ... | ... | ... | ... | Rs. | 1,035 | 6 | 8 |
| To Personal Account ... | ... | ... | ... | ... | 3,390 | 12 | 2 |
| To Investments ... ... | ... | ... | ... | ... | 1,45,923 | 2 | 2 |
| | | Total Rs. | | ... | 1,50,349 | 5 | 0 |

Examined and found correct.
MEUGENS AND KING,
*Public Accountants,*
30*th January*, 1889.

## No. 7.

## *Account.*

### Cr.

EXPENDITURE.

| | | | | | | |
|---|---|---|---|---|---|---|
| By Asiatic Society ... ... ... | Rs. | 21,383 | 3 | 9 |
| By O. P. Fund ... ... ... ... | ... | 17,353 | 1 | 1 |
| By Sanskrit Manuscripts Fund ... ... ... | | 1,507 | 4 | 0 |
| By Personal Account ... ... ... ... | | 3,186 | 13 | 7 |
| By Investments ... ... ... ... ... | | 31 | 4 | 4 |
| By balance ... ... | | 1,035 | 6 | 8 |
| Total Rs. ... | | 44,497 | 1 | 5 |

WILL KING,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

## No. 8.

## *Sheet.*

### Cr.

| | | | | | | |
|---|---|---|---|---|---|---|
| By Asiatic Society ... ... ... | Rs. | 1,38,032 | 4 | 14 |
| By O. P. Fund ... ... ... ... | ... | 7,713 | 11 | 0 |
| By Sanskrit Manuscripts Fund ... ... ... | | 3,442 | 1 | 0 |
| By Trust Fund ... ... ... ... ... | | 1,161 | 3 | 10 |
| Total Rs. .. | | 1,50,349 | 5 | 0 |

WILL. KING,
*Honorary Secy. and Treasurer,*
*Asiatic Society of Bengal.*

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

FOR JANUARY, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 2nd January 1889, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following Members were present:

E. T. Atkinson, Esq., Bábú Gaurdás Bysack, Bábú Saratchandra Dás, S. R. Elson, Esq., Dr. Hoernle, T. R. Mallet, Esq., W. H. Miles, Esq., Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

Visitor:—Mohunt Omrao Giri Gossain.

The Minutes of the last Meeting were read and confirmed.

Fifty-eight presentations were announced, details of which are given in the Library List appended.

The following gentlemen, duly proposed and seconded at the last Meeting of the Society, were ballotted for and elected Ordinary Members.

Bábú Jogendra Chandra Ghose, M. A., B. L.
G. C. Dudgeon, Esq.
Kumár Rameswar Maliáh, of Searsole (re-elected).

The following gentlemen are candidates for election at the next meeting.

Bábú Surendranath Ráy, B. L., Pleader, High Court, proposed by Bábú Asutosh Mukerji, seconded by H. M. Percival, Esq.

C. Little, Esq., M. A., Professor, Presidency College, proposed by Lt.-Col., J. Waterhouse, seconded by A. Pedler, Esq.

The PRESIDENT said: I have much pleasure in announcing that His Excellency the Viceroy has been graciously pleased to accept the office of Patron of the Society. The following is the letter received from the Private Secretary to His Excellency, in reply to the invitation of the Council.

GOVERNMENT HOUSE.
*Calcutta, 1st January* 1889.

SIR,

I am desired by His Excellency the Marquess of Lansdowne to acknowledge the receipt of your letter of the 27th ultimo, and to request you to inform the Council of the Asiatic Society of Bengal that the Viceroy accedes with much pleasure to the desire of the Society that he should accept the office of Patron in succession to the Marquess of Dufferin and Ava.

His Excellency has long been aware of the services which your Society has rendered to Oriental research, and the illustrious names which adorn its rolls are familiar to him.

The Viceroy trusts that the future career of the Society may be worthy of the eminent position which it has maintained during the past hundred years under his predecessors.

I have the honor to be, &c.,
J. C. ARDAGH.

The PRESIDENT announced that the Photographic Society of India had offered the use of their reading-room and dark room at 29 Chowringhee to any Members of the Asiatic Society who may be interested in Photography. The rooms are open from 6 A. M. to 10 P. M. and the latest photographic news-papers and publications will be found on the tables.

The PRESIDENT also intimated the resignation of Mr. Percival, and said—

It is with considerable regret that I have to announce that Mr. H. M. Percival has been obliged to resign the arduous office of General Secretary on account of bad health and pressure of work. Mr. Percival has held the office since 1886 and has carried on the work with very commendable efficiency. I am sure he will have our very cordial thanks for the work he has done for us so long, and our sympathy in the circumstances which have caused him to give it up. I propose, therefore, that we record a formal vote to that effect.

The proposal, seconded by Mr. E. T. Atkinson, was carried unanimously.

The PRESIDENT added that he was pleased to say that Mr. C. Little,

who would be proposed as a candidate for election that evening, had agreed to undertake the duties and the Council were glad to have obtained his services.

The PRESIDENT exhibited a medal presented to the Society by the Corporation of the City of London in commemoration of the visit of Indian Potentates and others to London in connection with the Colonial and Indian Exhibition of 1886.

The PRESIDENT exhibited two Rowland's diffraction gratings, one plane, the other concave; also a copy of Professor Rowland's photographed map of the solar spectrum from λ 5075 to λ 3795 obtained with a large concave grating, and said:—

Although these gratings and photographs are now fairly well known in Europe and America, they are, I believe, quite new in India, certainly in Calcutta, and therefore may be of interest to the meeting. There can be no doubt that Professor Rowland has by the invention of the concave grating, the perfection to which he has brought the machine used for ruling the gratings, and the liberality with which they have been put at the disposal of spectroscopists at very reasonable prices, given an enormous impetus to spectroscopic research, especially as applied to the sun and to the spectra of the elements as obtained by means of powerful electric currents.

The two gratings before the meeting are ruled with 14,438 lines to the inch, which is the number usually adopted by Professor Rowland, though they are also made with more or less close ruling.

The principle on which these gratings work is not quite easily explained, but will be found in the standard works on optics and spectroscopy. It will suffice to note that when a strong ray of white light is thrown upon one of these gratings, on either side, right and left of the direct and bright white central reflection, a series of more or less brilliantly coloured spectra will be seen, all with their violet ends in the direction of the central white reflection, and overlapping each other more and more as the distance from the central reflection increases. If the light of the sun be passed through a fine slit parallel to the lines of the grating and viewed with a telescope, somewhat in the same way as when viewing a prismatic spectrum, the Fraunhofer lines of the spectrum can be seen with very great perfection, especially in the less refrangible regions of the yellow, orange and red rays, which appear in the true proportions of their wave lengths, instead of being unduly compressed as they are when viewed through prisms.

The spectra nearest the direct central reflection are termed the

spectra of the first order, and are generally the brightest and purest. They are apparently separated from the direct reflection on one side, and from the spectra of the second order on the other, by dark spaces, but at the violet end a considerable space is filled by the invisible ultra-violet rays extending beyond the H lines, at λ 3933, to λ 2200; a great part of which can be photographed by suitable appliances. Towards the red end also, there is a long series of rays invisible below A, which can also be photographed to about λ 10,000, as done by Abney; and they have been observed to an immense extent further by Mr. S. P. Langley, with his very sensitive thermopile called a bolometer. About the red end of the first order near B, the extreme rays of the ultra-violet of the second order begin to make their appearance when photographed, unless special means are taken to exclude them. Then appear the visible violet rays of the spectra of the second order; then the indigo, blue, green and so on, till we find the red end of the second order still more overlapped by the violet and blue rays of the third, and so on. With these gratings the spectra of one side are usually more brilliant than those of the other. Every grating has its own peculiarities, due to slight variations in the ruling. With glass gratings four series of spectra are formed round the circumference of a circle, by reflection and transmission; but with metal gratings only two, by reflection.

It will be noticeable that the deviation, or angular distance from the centre, of any particular ray in the successive spectra increases as the whole numbers 1, 2, 3, 4. The amount of dispersion in the spectrum of the second order is, therefore, twice that of the first; in the third order three times, and so on. This is a very valuable property of gratings in enabling spectra to be viewed under different dispersions with the same instrument. It must be noted that, as a rule, in the same way as with prisms, the amount of light decreases as the dispersion increases.

The amount of dispersion or deviation of any particular ray is inversely proportional to the sum of the width of a polished space and a groove; the closer and finer the ruling, therefore, the greater dispersive power of the grating.

Gratings have a further advantage over prisms that the spectra obtained with them are dependent on absolute measurements of the wave-lengths of the different rays. The wave-length may be obtained by multiplying the sum of the width of a transparent interval and a bar, or groove, by the angular deviation of the ray in the spectrum of the first order.

The deviations of two colours in the same spectrum are proportional to their wave lengths, and this is why in all the spectra the violet is nearest to the central reflection and the red most distant.

The plane gratings, as above remarked, are used much in the same way as prisms, either for photography or observing with a telescope. Light is passed through a fine slit attached to a collimating tube and lens, so that parallel rays from the slit fall on the centre of the grating and accurately parallel to the ruling. The image of the slit is then viewed through a telescope or received on the focussing glass of a photographic camera, mounted so that it can revolve on the same axis as the grating. Then by inclining the grating, or by revolving the telescope or camera, the spectra of the different orders are brought into view. When working with the higher orders of spectra special means have to be adopted for separating the overlapping spectra, either by a prism placed between the grating and the telescope or camera, or by using suitably coloured screens in front of the slit. Thus in photographing the red end of the spectrum, a red glass or other screen is always required to cut off the ultra-violet rays.

With plane gratings the focus changes in different parts of the spectra according to the refrangibility of the rays, and the foci of rays of different orders overlapping do not correspond. This latter property is often of use in measuring wave-lengths and coincidences of lines, in the various spectra.

The concave gratings were first introduced some six years ago by Professor Rowland, of the Johns Hopkins University, Baltimore, who made a greatly improved machine for ruling and adapted it to rule concave surfaces of speculum metal.

In these gratings, the lines of the spectrum, formed by the image of a fine slit, come to a focus at a distance from the grating equal to its radius of curvature, and, therefore, if the slit, the ruled surface of the grating, and the eyepiece of the telescope or photographic plate are always situated on the circumference of a circle of which the radii are equal to half the radius of curvature of the grating, the spectrum will always be in focus at any point on the circumference of the circle. Moreover, when the centre of the grating and the centre of the eye-piece, or photographic plate are in the same straight line, the line of foci will be perpendicular to the direction of the light, and the spectrum will be normal, whatever the position of the slit, provided it is on the circle.

It will be seen, therefore, that these gratings are especially suitable for photographic work—though from the amount of dispersion given, even by comparatively small gratings, the extent of spectrum included on a plate at any one time is comparatively small, unless long plates be used and curved to correspond with the curvature of the circle of which the focal length of the grating is the radius.

The camera in which the concave grating exhibited this evening is

used has been made up on the principle of the arrangement described by Captain Abney, R. E., in *Phil. Trans. Roy. Soc.*, Vol. CLXXVII, Part II, 1886, but modified so that it works automatically on a pivot placed below the centre of the grating. It consists of a long box or camera fitted at one end with a suitable holder in which the grating is placed so that it may be vertical and its axis centrical with the axis of the collimator, on one side, and to the centre of the photographic plate or eyepiece on the other. This holder has screw adjustments for slightly moving the grating in vertical and horizontal arcs.

To the other end of the box an ordinary photographic bellows-camera is adapted. The back of this camera is arranged so that the ordinary glass focussing-screen can be removed and its place supplied by eye-pieces which serve for focussing the lines sharply for photography or for observing by eye. The eye-pieces fit in a tube arranged to travel in slides vertically and horizontally, so that it can be brought to any part of the spectrum in any position within the size of the photographic plate. This tube is pivoted so as to be able to view the rays obliquely, which is very important in observing extreme rays, especially with the prismatic spectrum.

Below the grating end of the camera, and vertically underneath the centre of the grating, is a pivot by which the plank supporting the slit and tube is attached to the camera. This plank has grooves at the sides in which travels a bar carrying the Ys which support the tube. One of these Ys, nearest the slit, is fixed, and the other is moveable, sliding backwards or forwards, according to the length of the tube, and also right and left, so that the circle of light formed by the slit in passing through the tube may be centered on the grating. The Ys are elevated or lowered by means of screws, so that the axis of the tube may be levelled in a line with the centre of the grating and axis of the camera. A rack-work attached to the foremost Y, and worked by means of a Hook's joint attached to a long handle, enables the observer at the camera or eyepiece to gently turn the slit round so as to bring it exactly parallel to the lines of the grating. This adjustment, as Captain Abney has pointed out, is very important in securing good definition.

The sliding tube is a telescope tube fitted with additional screw joints so that it may be extended or shortened, as required, from about 1 foot to 5 feet.

The outer end of the tube carries the slit, which is adjustable by a micrometer screw. With the concave grating no collimating lens is necessary, as with the plane ones ; and this is a great advantage in dispensing with the use of glass, which always cuts off more or less of the extreme rays at both ends of the spectrum. The end of the tube is fitted

with rackwork by which the slit can be drawn in and out so that its plane may be brought exactly over a pivot fixed on the sliding bar carrying the Ys, and to which pivot is also attached a second bar the other end of which is fixed by a pivot placed below the camera at a central point between the grating and the photographic plate. The apparatus is adjusted so that the distances from the central pivot of the camera to the grating, the photographic plate and the slit are all equal to half the radius of curvature of the grating, and the lines of the spectrum should then appear in sharp focus when viewed through the eye-piece placed so as to focus the centre of the ground-glass of the camera. As the camera is drawn away from the slit the violet of the first order comes into view, followed by the indigo, blue, &c. Beyond the red end of the spectrum of the first order there is an apparently dark space, which, as I remarked above, is really filled with lines of the invisible ultra-violet of the second order. About *b* of the second order, the violet lines of the third order make their appearance, and below the D lines of the second order come the H lines of the third order; so that if it is required to photograph these D lines a yellow screen must be used; otherwise the photograph obtained will show the H and other violet lines most prominently, as one of the plates I have with me will show.

With the apparatus as it stands, the D lines of the third spectrum are just beyond the travel of the camera; but by a little adjustment of the tube they could be seen. The *b* lines of this spectrum can readily be seen, with very considerable dispersion.

In working the apparatus, it is best to set the plank carrying the tube in the direction of the heliostat, and then fasten it down by clamps or screws on to a table large enough to carry the whole apparatus and admit of the camera being opened out to its widest extent. As the end of the camera moves round on a circular arc, it is quite easy to mark off on the table the positions of the principal lines on a corresponding arc, so that the centre of the camera can be brought to any particular line in either of the orders, at once. If greater accuracy is required, scales of wave-lengths can be marked off, in the same way, for the different orders, either along the arc or along the grooved plank in which the tube slides.

I am sorry I am unable to show you the powers of the instrument, but even with an electric-light apparatus it would be difficult to do so satisfactorily. The capabilities of the new gratings can only be fully appreciated by observing the solar spectrum; and without exaggeration I may say that it is one of the most fascinating things I know to watch the lines in different parts of the spectrum under their varying aspects and groupings, and to feel that in them may be the key to mighty and yet unfathomed secrets of the universe.

The red end, from D to A, is particularly interesting, especially about sunset. I have already noticed considerable variations in the number of lines that can be seen between the D lines. During the rains, 11 could generally be easily counted, but during the dry cold weather we have just been having, 7 or 8 only can easily be distinguished. Two Sundays ago, however, the full number of 11 were counted; though fainter than in the rains. Once one has mastered the instrument, it will probably not be difficult to take photographs showing many of the more notable changes in this part of the spectrum at different times of the day and seasons of the year. I have already succeeded in obtaining fair photographs of the B and a groups and even of A, with possible traces of lines below in the ultra-red, though this is nothing new.

The apparatus has been made up at the Mathematical Instrument Office, and I am indebted to my colleague, Major C. Strahan, R. E. for many useful hints, and to Mr. T. Marshall, Mathematical Instrument maker, for his assistance in making it up.

The large map of the diffraction spectrum I have placed on the board has been brought out by Prof. Rowland, and has, I believe, been made with a concave grating of about 21 feet focus. This gives an enormous dispersion, far beyond the power of the most powerful prismatic spectroscopes. A great deal more can, of course, be seen by the eye with such an instrument than can be photographed, but Professor Rowland believes he has very nearly reached the limit of visibility. This map has now become the standard of reference for the solar spectrum; at present it only extends to $\lambda$ 5795 and does not include the D group and below. It is to be hoped that it will be possible to extend it at least to A.* With my small grating I can see almost all that is shown on the maps, using an eyepiece of fairly strong power—though I cannot photograph anything like so much.

I should be glad to show the working of these instruments to any members of the Society who would like to see them.

Bábú Sarat Chandra Dás exhibited a coloured drawing giving a bird's eye view of Tashi-lhun-po (the second city in Tibet) the capital of the Tashi-Lama, obtained as a present from the Political Agent of the Dalai Lama at Peking.

The Philological Secretary read the following letters:

1. Letter from Bábú Gaurdás Bysack intimating the presentation to the Asiatic Society of two rare Tibetan MSS. by Omrao Giri Gossain, the Mohunt of the Bhotebagan Temple, Ghoosery.

* Since this was written a new edition of this map extended to B has been announced.

"It gives me great pleasure to be the medium of procuring for the Oriental Library of our Society two rare valuable Tibetan MSS. which Puran Giri Gossain in the last century brought with him from the Court of the Tishu Lama, to which he was deputed as an Embassy, and which his present successor, Mohunt Omrao Giri Gossain, has entrusted me for presentation to the Society. The only condition he desires to attach to his gift is, that should the Society publish the MSS., as he ardently hopes it will, two copies of the work may be given him for his and his brother Mohunt Belasgir Gossain's use and benefit.

"As soon as the MSS. were handed to me by the esteemed Gossain I placed them in the hands of my friend, Bábú Sarat Chandra Dás for examination. His notice of the works, together with the MSS., will be laid before the next General meeting, when I propose, with the permission of the Council, to read my note on the Buddhist Monastery at Bhotebagan opposite Calcutta, and on the celebrated Puran Giri Gossain."

The following is the notice of the two works by Bábú Sarat Chandra Dás, referred to in the letter.

The bundle contains two block print volumes, one is the great work called Lam Rim Chhen-po, *i. e.*, "the large work on the gradual way to perfection", and the other is called *R*dorje *H*chhañ Chhenpo*h*i Lam gyi Rim-pa, (see page 197, Csoma's Tibetan Grammar). Both the works are much damaged by damp and insects.

As regards the work called Lam Rim Chhe-wa, composed by the great reformer Tsoñkhapa, I do not hesitate to say that it is *the* most important religious and philosophical work of Tibet. What the Dhammapada is to the Southern Buddhists, or the Veda to the Bráhmans, the Lam Rim Chhe-wa is to the paramount church of Tibet. In it are condensed the pith of the Tripiṭaka of the Maháyána school, and the substance of the philosophical teachings of Nágárjuna, Árya Sangha, Chandra Kírti, Dharmottara and other ancient Indian Buddhist sages. The recovery of a copy of this great work from the hitherto obscure *maṭh* of Bhot Bagan will, I may venture to add, be welcomed by the Tibetan students of Europe and America, inasmuch as no copy of the Lam Rim Chhe-wa exists in any of the great libraries of London, Paris, or St. Petersburgh. This work, when published, will enable the students of Tibetan to ascertain the Maháyána philosophy as it is understood in Tibet, and also the cult of the northern Buddhists. The Prajñápárámita, or its Tibetan version the Sher-chin, may be of some use to those who care to know what the Buddhism of Nepal was in the early centuries after Christ, but as occidental scholars are now beginning to take greater interest in the sacred literature of Tibet than in that of Nepal, I believe they may

care more to read the Lam Rim Chhe-wa, than the Sher-chin The former, when printed, may cover about four fasciculi of the Bibliotheca Indica. I have a xylograph copy of it, obtained from Tashi-lhun-po, which, with the Society's copy (also a xylograph), will enable one to edit the work.

The following is a literal translation of the introduction :—

"Herein is condensed :—the substance of the "excellent word" (*pravachana*) of Jina—the doctrines of both Nágárjuna and Árya Sangha of the great vehicle (Maháyána)—the religious practices of the principal personages who have gone over to the knower of all things—the abridgement of the complete series of the study of the *three persons* (*purusha-traya*) ; and (in short) herein is explained the manner how to conduct one's self according to the (doctrine) of "the gradual way to perfection" to the blessed Buddha.

In this I wish to explain the Dharma (Buddhist religion) in reference to the three purities ; *viz.*—(1) the purity of the speech of the teachers (in connection with the Buddhist sages of Śrí Nálendra)—(2) the purity of the line of their pupils—(3) and the purity of the doctrines (they) expounded.

In later times the (Buddhist) creed (*śásana*), being developed at Vikramaśíla, among its scholars there were eminent authors. The excellence of religious teaching, the manner of its explication, and the two important methods of comprehending it will be explained here. According to first of these (methods) there are four stages in the gradual way to perfection of the Bodhisattvas :—(1) for shewing veneration to the origin of Dharma and thereby to set forth the greatness of the author ; (2) for growing faith in the precept (doctrine), so as to point out the superiority of the Dharma (Buddhist creed) ; (3) how to explain and hear the Dharma that is possessed of the two greatnesses (excellences) ; and (4) how to guide the student by the real precept.

This precept is generally of the doctrine of Abhisamayálankára, or the ornament of judicious learning, which was promulgated by the venerable Maitreya. The basis (original work) of this (Lam-Rim-chhe-wa) is especially the work called Bodhipatha pradípa—the author of which is also relatively the author of this work (Lam-Rim-chhe-wa). He is the great teacher Dípánkara Śríjñána, who is well known by his other name *D*pal *l*dan Atíśa."

The last leaf, which is numbered 491, contains the following : "With the exception of the demonstration of the general characteristics of the three persons (*purusha-traya*) mentioned in the "Bodhipatha pradípa," all other terms being easy have not been introduced here. This work has been based upon the contents of the Lam Rim, written

by the great Locháva (Rinchhen *B*ssañpo) and the Doluñpa father and spiritual son. It contains the substance of numerous Lam-rim works (by different authors). Being possessed of all the requirements of the "*way*" in a convenient manner, and there being no confusion in its arrangement, this work was composed by the great renouncer and S'rávaka S'ar Tsoñkhapa, *B*Lo *b*ssañ Grag*s*-pa *D*pal, the hermit of the Maháyána doctrine of Himavat at the branch monastery of *R*gyal-wa*hi d*Wen *g*na*s* of Byañ Ra-deñ. It was printed at the mountain retreat of Brog Señge*hi* Shol, the writer being *B*so*d* nam*s d*pal *b*ssañpo."

No. 2. The second work is the principal work on Tantrikism (as adopted by the reformed or Gelug-pa School of Tibet, of which the Dalai Lama is the head.) It is called *R*dorje *H*chhañ Chhenpo*hi* Lam-gyi-Rim-pa. In it is embodied the substance of the sixty volumes of the Kahgyur collection, which treat of the Tantras and the esoteric cult of the Northern Buddhists. This work is unique in its character, because, as the Tantric works of Tibet are compared with the great oceans on account of their vastness and immensity, no work exists in Tibet in which one could find the real meaning of Tantrik doctrines and rites explained in a lucid manner. This work alone is able to give an idea of the Tantrikism of Tibet and Magadha. I did not meet with such a work in Tibet or Peking. I therefore congratulate you in the discovery of a work in the temple of Bhotbagan which does not occur in the Society's library or in the libraries of Europe. Lam-gyi Rim-pa is a purely Tantrik work and treats of the Tantrik cult of the Gelug-pa or yellow hat School, called the *R*dorje Theg-pa or the venerable vehicle doctrine. In it are described the various mystic rites and ceremonies for propitiating the tutelary deities, and also for entering into what is called the direct and the shortest path to the state of beatitude of the northern Buddhists. The blocks from which this work was printed were engraved in Peking. Purangir must have brought it from Peking when he returned to India after the death of the Tashi Lama. This work will be of much interest to those who wish to inquire about the esoteric part of the Gelug-pa Buddhist religion.

The author, Tsoñkhapa (called Lo-ssañ tagpai pal or Sumati Kírti S'rí), begins the work as follows:—"Whereas the power of the argumentative philosophy of the "great doctrine" is not mean, the Protector of the doctors of the Buddhist divinity, out of mercy for the common people, with a view that they might be firm in their faith and that the wicked, who are wandering in the world and to whom the liberation from that state is most difficult, might in a short space of time attain to the state of Buddha who alone is the object of universal refuge, has promulgated this shorter means of attaining Nirvána. It is for that reason

that I have here to explain the gradual way of the venerable Vajradhara." The work contains 40 chapters extending over 450 leaves.

The author concludes the work in the following manner:—"This work, called *R*dorje *H*chhañ Chhenpo*h*i Lam gyi Rimpa, which fully opens the substance of all mysteries, has been compiled for the purpose of acquiring a thorough culture in the profound learning of the aphorisms and the mantras of the Buddhists. The author, Sár Tsoñkhapa *B*lo *b*ssañ Grag-pa, a monk of Sákyamuni, after a careful examination of all the Tantrik works, has composed this work at the hermitage of Chambaling, also called Sañ ñag nañ (the house of mysteries), attached to the great monastery of *H*ode Guñ *R*gyal, which is situated at the foot of the Prince of the Mountains of Himavat (Tibet). The writer (on the blocks) was *B*so*d* nam*s* *d*pal *b*ssañ-po, surnamed *D*ka*h* *b*shi *h*dsin-pa of Gyag-sde. Let this work be also possessed of the power to spread the sacred creed to all directions in all the quarters of the world."

2. Letter from Bábú Hanumán Prasáda, Raís, of Chunar, forwarding copy of an inscription and photographs of some sculptures lately discovered in a rock temple in the Chunar Fort.

"I have the pleasure to send photographic views of Hindú gods of a cave temple recently discovered on the south-west corner of Fort Chunar. On its first opening it was found to be a mere quarry hole with a ledge of rock left overhead as a roof. This gives an idea that it is something like the cave temple described in Indo-Aryans of Dr. Rájendralála Mitra, Vol. I, p. 18, l. 30. The images are beautifully cut on the rock and when the place was excavated they were found no way injured. The rock appeared of peculiar quality per Dr. Oldham's remark given in Indo-Aryans, Vol. I, p. 79.

"I send a lithographic copy of the inscription engraved on the foot of the images which I hope will be deciphered by the distinguished scholars of your well-known Society.

"In the meantime I shall feel much obliged for a copy of the translation when the inscription is deciphered by your Society, giving also an idea of its antiquity.

"I shall be glad to furnish you with any other information you may require connected with this cave temple, for the preservation of which I have obtained the sanction of the Military authorities, and am arranging for the erection of a temple there."

The Philological Secretary read a Report on a find of six old coins in the Sarun district, forwarded by the Collector of Sarun with his No. 560 G, dated 3rd July 1888, and No. 1239 G, dated 3rd December 1888.

1. These coins appear to have been found by some children of the village of Deolokhan, near Baniyápur, in the Sarun district.

2. They are of more or less impure silver, and belong to the class, commonly called "Indo-Sassanian" (see Prinsep's *Indian Antiquities*, Vol. I, p. 32, 402-410). Coins of this class are found in large numbers, and are of no particular value. The six coins under report are not good specimens; one of them is broken in two, apparently for the purpose of testing the metal.

The following papers were read—

1. *Notes on Assam Butterflies.—By* William Doherty, Esq. *Communicated by the* Natural History Secretary.

2. *On certain Earth-worms collected in the Western Himalaya and Dehra Dun.—By* Alfred Gibbs Bournne, D. Sc. (Lond) C. M. Z. S., F. L. S., *Fellow of University College, London, and of the Madras University. Communicated by the* Superintendent of the Indian Museum.

These papers will be published in the Journal, Part II.

3. *Vikramasílá and the Pála kings of Magadha.—By* Bábú Sarat Chandra Dás.

The paper will be published in the Journal, Part I.

## Library.

The following additions have been made to the Library since the Meeting held in December last.

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# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

## FOR FEBRUARY, 1889.

The Annual Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th February 1889, at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the chair.

The following members were present:

E. T. Atkinson, Esq., H. Beveridge, Esq., Bábú Gaurdás Bysack, W. R. Criper, Esq., Bábú Saratchandra Dás, E. Gay, Esq., Bábú Rajanikánta Gupta, Kumar Rameswar Maliáh, Major General Mainwaring, R. D. Mehta, Esq., Bábú Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., Moung Hla Oung, Esq., T. A. Pope, Esq., H. M. Rustomjee, Esq., Dr. J. Scully, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

Visitors:—Dr. J. Burgess, Rev. Dr. Lansdell, R. H. M. Rustomjee, Esq., C. H. M. Rustomjee, Esq.

According to the Bye-Laws of the Society the President ordered the voting papers to be distributed for the election of Office-Bearers and Members of Council, and appointed Messrs. Beveridge and de Nicéville, Scrutineers.

The PRESIDENT then called upon the Secretary to read the Annual Report.

## ANNUAL REPORT FOR 1888.

The Council of the Asiatic Society have the honour to submit the following report on the state and progress of the Society's affairs during the past year.

## Member List.

During the year under review, 21 gentlemen were elected Ordinary Members of the Society, 14 members withdrew, 5 died, 9 were removed from the list, *viz.*, 2 under Rule 38, as defaulters, and 7 under Rule 40, being more than 3 years absent from India, and 1 member was struck off on account of non-payment of his admission fee, by which his election became void under Rule 9. Of the 21 members elected, 2 were old members who rejoined. The total number of members at the close of 1888 was thus 305 against 313 at the end of the preceding year—of these 98 were Resident, 136 Non-Resident, 15 Foreign, 20 Life, 34 Absent from India, and 2 Special Non-Subscribing members, as shown in the following table, which also gives the fluctuations in the number of Ordinary Members for the past 6 years.

| Year. | Paying. | | | | Non-paying. | | | | Grand Total. |
|---|---|---|---|---|---|---|---|---|---|
| | Resident. | Non-Resident. | Foreign. | Total. | Life. | Absent. | Special Non-Subscribing. | Total. | |
| 1883 ... | 100 | 142 | 18 | 260 | 15 | 47 | 1 | 63 | 323 |
| 1884 ... | 102 | 157 | 12 | 271 | 15 | 39 | 1 | 55 | 326 |
| 1885 ... | 105 | 161 | 13 | 279 | 16 | 34 | 1 | 51 | 330 |
| 1886 ... | 93 | 142 | 18 | 253 | 16 | 48 | 2 | 66 | 319 |
| 1887 ... | 98 | 137 | 15 | 250 | 17 | 44 | 2 | 63 | 313 |
| 1888 ... | 98 | 136 | 15 | 249 | 20 | 34 | 2 | 56 | 305 |

The five Ordinary Members the loss of whom by death during the year we have to regret, were Mr. F. Fedden, Mr. S. S. Jones, Mr. J. Hart, Mr. J. MacDonald and Surgeon Major J. J. Monteath.

Among the Corresponding Members intimation has been received of the death of Professor Holmböe of Christiania. Their number now stands at 7.

There were no casualties among the Special Honorary Centenary Members, Honorary Members, and Associate Members, their numbers standing at 6, 27, and 8 respectively.

Three members compounded for their subscription as Non-Resident Members, *viz.*, Hon. Ajodhianath Pandit, Mr. A. P. Pennell, and Bábú Gaurdás Bysack, and the latter gentleman was also exempted from further subscription as a Resident Member, under Rule 27, in consideration of his long connection with, and former services to the Society.

## Indian Museum.

The following presentation made to the Society was transferred to the Indian Museum under the provisions of Act XXII of 1876.

A stone slab (broken into 3 pieces) containing an inscription in Nagari characters, dated 1720 Vikramáditya Samvat, found in the village of Khukhrá in Chuṭia Nagpur, referred to in the Society's *Proceedings* for November 1887.

Dr. D. D. Cunningham was appointed a Trustee on behalf of the Society in the place of Mr. E. T. Atkinson, who vacated on becoming a Government Trustee in his official position as Accountant-General, Bengal.

The other Trustees on behalf of the Society were :—

Dr. A. F. R. Hoernle.
Rájá Rájendralála Mitra, LL. D., C. I. E.
E. Gay, Esq.
A. Pedler, Esq.

## Finance.

The accounts of the Asiatic Society are shown in the appendix under the usual heads.

Statement No. 8 contains the Balance Sheet of the Asiatic Society and of the several Funds administered through it.

The Budget of the year 1888 was estimated at the following figures :—Receipts, Rs. 14,000. Expenditure, Rs. 20,324 (Ordinary Rs. 13,824, Extraordinary Rs. 6,500). Taking into account only the ordinary items of receipt and expenditure for the year 1888, the actual results have been :—Receipts Rs. 15,131-11-6 and Expenditure Rs. 13,667-12-2, leaving a balance in favour of the Society on its ordinary working of Rs. 1,469-15-4.

There has, however, been an unusually large amount of extraordinary expenditure on account of further heavy repairs to the Society's building, and for the erection of an iron railing and gates in place of part of the old boundary wall which was acquired by the Municipality, as reported last year. The compound has also been thoroughly put in order, and the out-houses repaired. The cost of all these repairs and alterations is estimated at Rs. 9,101.—of which Rs. 7,363-14-1 were paid during the year, leaving about Rs. 1,737 still due. Deducting the Rs. 2,116 paid in the year before by the Municipality, the total cost of the railing and gates borne by the Society was Rs. 1,334, and the cost of further repairs expended during the year was Rs 3,913-14-1, or a total of Rs. 5,247-14-1. This amount cannot, however, be fairly charged to the account for the year, but should be spread over a term of at least 4 years.

It seems also desirable that, if possible, a sum of Rs. 1,000 should be set apart in the Budget yearly to meet the cost of these extraordinary repairs as they recur from time to time; but it is impossible to do so without cutting down expenditure in other items, and this it is difficult to do.

The other items of extraordinary expenditure are trifling, and include Rs. 100, Auditing fee, Rs. 250, for purchase of coins, and Rs. 1-9-6 for postage charges in connection with the enquiry into the Barisal Guns. To meet this extraordinary expenditure Rs. 4,000 of our securities in Government paper had to be sold out, reducing the capital of the Society to Rs. 1,38,000, nominal value.

The total receipts have been Rs. 15,137, against an estimate of Rs. 14,000. The excess is due to an increase in all the items. Under *Subscriptions* the estimate was Rs. 7,300, and the actuals Rs. 7,623, of which Rs. 700 were received on account of Compounding Fees, but these have to be invested in the Permanent Reserve Fund under Rule 70, and cannot therefore be taken as income. Under *Sale of Publications* the estimate was Rs. 400 and the actuals Rs. 724-10-11, of which Rs. 608-0-11 is credited on account of sales by Trübner & Co., amounting to £ 43-1-5, at 1-5d per rupee. *Interest on Investments* was estimated at Rs. 6,200, but the actuals are Rs. 6,594-7-7. The difference is explained by the fact that Rs. 142 were received as interest for 2⅔ months on the investment of Rs. 10,000 transferred from the $4\frac{1}{2}$% to the 4% loan when the former was paid off by Government in November last. Owing to the reduction of the balance of the O. P. Fund only Rs. 240 has been credited to the Fund instead of Rs. 480 as in the previous year, and Rs. 240 has thus accrued to the Society. Owing to the transfer of Rs. 10,000 of the Society's funds to the 4% loan the amount of interest we shall receive in future will be less than it has been, and this has been taken into account in framing the Budget for 1889. The *Miscellaneous Receipts* have been Rs. 195-5-0 against Rs. 100 estimated. Deducting Rs. 700 on account of Compounding Fees and only Rs. 142 excess of interest, the total ordinary receipts become Rs. 14,294, showing an excess of Rs. 294 over the estimate.

The ordinary expenditure was estimated to be Rs. 13,824, but the actual expenditure has been Rs. 13,667-12-2. The principal items in excess are *Taxes*, *Postage*, and *Purchase of Books* which is Rs. 720 above the estimate. The actual expenditure on the *Journal* and *Proceedings* has been

| | | |
|---|---|---|
| *Journal* | *Part I*— | Rs. 876-8-0 |
| | *Part II*— | ,, 3,107-4-2 |
| *Proceedings*— | | ,, 669-7-0 |

making a total of Rs. 4,653-3-2, which is less than the budget estimate by Rs. 746-12-10,; but a sum of Rs. 1,714-4-0 remains due on this account, *viz.* Rs. 155-0-0 for Part I; Rs. 855-3-0 for Part II and Rs. 704-11-0 for *Proceedings.* The expenditure on *Journal, Part II,* has again been very heavy, chiefly owing to the large number of plates, many of which have been done in Europe.

The Budget Estimate of Ordinary Receipts and Expenditure proposed for 1889 does not differ much from that for 1888, the probable receipts may again be put down at Rs. 14,000 and the ordinary expenditure at Rs. 13,920.

On the receipts side the estimate under the head of "*Subscriptions*" has been left at the same amount as last year. The amount to be received from "*Sale of Publications*" has been estimated at Rs. 400. The amount estimated for interest is placed at Rs. 6,200, which allows for the sale of Rs. 3,000 to meet immediate liabilities.

On the expenditure side the changes in last year's estimate are slight—a small addition has been allowed for "*Establishment,*" also for *Taxes, Postage* and *Books.* Rs. 4,200 have been allowed for the *Journal,* as before, but the *Proceedings* have been reduced to Rs. 1,000.

The only probable item of extraordinary expenditure this year is Rs. 1,737 on account of balance due for the repairs to the Building. For this, and also to pay off outstanding bills of Messrs. Trübner and Co., it may be necessary to sell out about Rs. 3,000 of our securities. The expenditure on account of *Repairs* which has been so heavy during the last 2 years should not now occur again for many years to come.

The Budget Estimate for 1889 is as follows :—

RECEIPTS.

| | | | |
|---|---|---|---|
| Subscriptions ... ... ... | Rs. | 7,300 | 0 0 |
| Sale of Periodicals ... ... ... | ... | 400 | 0 0 |
| Interest on Investments ... ... | ... | 6,200 | 0 0 |
| Miscellaneous ... ... ... | ... | 100 | 0 0 |
| | Rs. ... | 14,000 | 0 0 |

EXPENDITURE.

| | | | |
|---|---|---|---|
| Salaries ... ... ... ... | Rs. | 4,200 | 0 0 |
| Commission ... ... ... | ... | 380 | 0 0 |
| Stationery ... ... ... | ... | 100 | 0 0 |
| Lighting ... ... ... ... | ... | 80 | 0 0 |
| Building-Ordinary ... ... ... | ... | 20 | 0 0 |

| | | | |
|---|---|---|---|
| Municipal Taxes ... ... ... ... | 780 | 0 | 0 |
| Postage ... ... ... ... ... | 650 | 0 | 0 |
| Freight ... ... ... ... ... | 20 | 0 | 0 |
| Meeting ... ... ... ... ... | 100 | 0 | 0 |
| Contingencies ... ... ... ... | 150 | 0 | 0 |
| Books ... ... ... ... ... | 1,600 | 0 | 0 |
| Local Periodicals ... ... ... ... | 40 | 0 | 0 |
| Binding ... ... ... ... ... | 500 | 0 | 0 |
| Journals ... ... ... ... ... | 4,200 | 0 | 0 |
| Proceedings ... ... ... ... | 1,000 | 0 | 0 |
| Printing Circulars ... ... ... ... | 100 | 0 | 0 |
| Rs. ... | 13,920 | 0 | 0 |

Extraordinary expenditure during 1889.

| | | | |
|---|---|---|---|
| Auditor's Fee ... ... ... Rs. | 100 | 0 | 0 |
| Repairs to House ... ... ... ... | 1,737 | 0 | 0 |

## London Agency.

The statement furnished by Messrs. Trübner & Co. of their account with the Society for 1887 showed a debit balance of £109-19-7, of which £55-11-0 represented payments made for Plates for the Journal, Part II.

The sales of the Society's Publications effected by them during 1887 amounted to £43-1-5 and of the Bibliotheca Indica to £19-8-0—This is an improvement over the sales of the previous year, which were only £14-19-4½ and £6-3-6 respectively.

The numbers of copies of parts of the Journal, of the Proceedings, and of the Bibliotheca Indica sent to Messrs. Trübner & Co. during 1888 for sale were 611—360, and 1524 respectively.

Thirteen invoices of books purchased, and of publications of various Societies sent in exchange, were received during 1888. The value of books purchased amounted to £109-6-6, which includes a subscription of ten guineas to the Pali Text Society for their publications for the next six years.

## Library.

The total number of printed volumes, or parts of volumes added to the Library during the year was 2,112, of which 816 were purchased and 1,296 presented.

The Catalogue of the Burmese Manuscripts has been printed, and those of the Persian and Tibetan Manuscripts are both passing through the press.

### Publications.

There were published during the year nine numbers of the Proceedings, containing 219 pages of letter press and 4 plates; two numbers of the Journal, Part I, containing 82 pages of letter press and 11 plates; and three numbers of the Journal, Part II, containing 272 pages of letter press and 15 plates. There was also published a fifth number of the Journal, Part II, for 1887, containing the Index, &c. for that year.

### Building.

Extensive repairs had to be undertaken during the year. Twenty-one beams were found defective on the ground floor, and were replaced by rolled iron girders, so that they will not again require renewal. The south wall of the meeting-room was also found to be in a very defective state, and has been strengthened by iron rails across the arches over three of the doors, whilst the whole of the ground floor and staircase has been whitewashed and painted, and the corridors colour-washed. The exterior of the building and the out offices were thoroughly repaired and, painted, and in addition, the compound has been entirely re-arranged and laid out in grass. Wire netting was also fixed to many of the windows on the ground floor, in order to give better ventilation by allowing the windows to be kept open during the day. The total cost of these repairs will be about Rs. 5,237, of which Rs. 3,913-14-1 has been paid.

The new iron railing and gates, mentioned in last year's report, have been erected at a cost of Rs. 3,450, of which Rs. 2,116 was received from the Municipality for the strip of the Society's land taken up under Act X of 1870, for widening the footpath in Park Street.

### Coin Cabinet.

During the year under review 108 coins were added to the Cabinet by acquisition under the Treasure Trove Act. Of these 81 were from the Bengal Presidency, and 27 from the Bombay Presidency. No coins were received from Madras.

The 81 coins acquired in the Bengal Presidency were the Society's share of troves found at Bijnaur, Hoshangábád, Rohtak, Sárun, Sháhpur, Sialkoṭ and Wardha. They comprised 11 gold, 28 silver, 8 gold and silver. and 32 silver and copper coins; there was also one silver-gilt forgery, These coins belonged to the following classes: (1) later Indo-Scythian,

*viz.*, *Kida* 6, *Yaśovarman* 4; (2) Paṭhan, *viz.*, Muḥammad bin Sám 7 (copper and silver), Muizzu-d-dín Kaiqobád 1 (Chron. No. 116), 'Aláu-d-dín Muḥammad 5 (Chr. Nos. 130, 133, 134), Muḥammad bin Tughlaq 2 (Chr. Nos. 175 *a*, 213), Fírúz Sháh 2 (Chr. Nos. 223, 225), Fírúz Sháh and Fatḥ Khán 1 (Chr. No. 240), and Fírúz Sháh and Zafar 1 (Chr. No. 245), all these being gold; (3) contemporaries of Patháns, *viz.*, Hasan Qurlagh 8; (4) Rájpút, *viz.*, Madanapála 2, Cháhaḍ Deva 9, Prithiráj 2; (5) Mughal, *viz.*, Aurangzíb 3, Bahádur Sháh 1, Farrukh Siyar 5, Muḥammad Sháh 10, Aḥmad Sháh 5, Sháh 'Álam 5, Akbar II 1, all these being silver; (6) one forgery. More detailed descriptions of these coins are given in the Society's Proceedings for April, May, August, November, and December.

The 27 coins presented by the Government of Bombay were the Society's share of troves found at Aḥmadábád, Amrávati District, Khandeish, Kurrachi, Nasik, Poona and Satara. It comprised 7 gold, 18 silver, and 2 copper coins. They belong to the following classes: (1) Mughal, *viz.*, Akbar 1 (gold), Sháh Jahán 3 (1 gold), Aurangzíb 6 (2 gold), Farrukh Siyar 2, Muḥammad Sháh 3, Aḥmad Sháh 1, 'Alamgír II 1, Sháh 'Álam 5; (2) Hún 3 (gold); (3) Gadhiyá 1; (4) Persian 1.

By purchase were acquired 68 coins; *viz.*, 3 silver Indo-Sassanians from the Government of the North-Western Provinces, and 65 from Mr. J. G. Delmerick. The latter comprised 1 gold (Gupta), 49 silver and 15 copper coins. They belonged to the following classes: 38 Bactrian, 2 Sassanian, 1 (Samudra) Gupta, 16 Paṭhán, 3 Mughal, 2 Old Hindú, 2 Ghazní, 1 Kábul. Among the Bactrians there were two of considerable value, and are described in the Society's Proceedings for April. A large number of these coins, of which the Society already possessed other specimens, were subsequently re-sold to members that wished to possess them.

### Office of the Secretaries.

Mr. J. Wood-Mason and Dr. Hoernle continued as Natural History Secretary and Philological Secretary thoughout the year. Mr. H. M. Percival held the post of General Secretary till December, when he resigned owing to pressure of work and ill health: Dr. Hoernle has carried on the duties in the interval which will elapse before Mr. Little can take them up.

Mr. A. Pedler continued Treasurer until September when he was obliged to resign on account of failing health and pressure of official work. Dr. W. King succeeded him in November, the duties being carried on by Mr. A. Simson in the meantime.

Mr. H. Ronaldson continued as Assistant Secretary during the year.

Mr. J. H. Elliott resumed charge of his post as Assistant Librarian in December, on return from leave for twelve months, as mentioned in the report for last year, when the acting arrangements made for carrying on his duties ceased.

Babu Nritya Gopal Bose continued as Cashier, Babu Hari Mohan Mukherji as Pandit, and Babu Jogesh Chandra Chatterji as Copyist, throughout the year.

## Bibliotheca Indica.

Fifty-eight fasciculi were published during the year, of which twenty-one were in the Arabic-Persian, thirty-four in the Sanskrit, and three in the Tibetan Series. They belong to twenty-six different works, of which four are in the Arabic-Persian, twenty in the Sanskrit, and two in the Tibetan Series. There was one new publication, the Taríkh-i-Fírúz Sháhí, in the first Series; eight in the second Series, *viz.* Aṇu Bháshyam, Advaita-Brahma-Siddhi, Bṛihad-dharma Puráṇam, Nyáya Kusumánjali Prakaraṇam, Sánkhya Sútra-vṛitti, Śrí Bháshyam and Tulsí Satsaí: whilst in the Tibetan Series there were two works, the Sher-Phyin and the *R*togs *b*rjod *d*pag *b*sam *h*khri Śíñ, of which three fasciculi were issued, being the first that have been published since it was mentioned in the Annual Address for 1887 that the Society intended to take up Tibetan works: the second work contains the Sanskrit text in juxtaposition with the Tibetan.

It was stated in the annual report for 1887 that 50 fasciculi had been estimated as the out-turn for the ensuing year, at a probable cost of Rs. 18,800. The actual out-turn has been 58 fasciculi, as already stated. The expenditure out of the Oriental Publication Fund during the year amounted to Rs. 17,353-1-1, which includes printing charges for 45 fasciculi, and editing charges for 51 fasciculi, and gives an average of Rs. 356 for each fasciculus, taking into consideration that bills for Rs. 1,872, representing printing charges for 5 and editing fees for 7 fasciculi, are still outstanding. For the year 1889 the out-turn may be reckoned at 50 fasciculi. These, at the above average rate, will cost Rs. 17,800. The average annual income, calculated on the receipts of the last 5 years, is Rs. 13,182, which gives an excess of estimated expenditure over average income of Rs. 4,618, towards meeting which there is a balance of Rs. 7,713-11-4. This balance will have to meet a further charge of Rs. 3,000, if a proposal that is under consideration to purchase a set of the Tibetan work "Tangyur," in block print, should be carried out.

Of the following works of which fasciculi have appeared in previous years no fasciculi were published during the year under review :—

1. Tabaqát-i-Náṣirí (Index of Persons and Places) ; 2, Prákṛita Lakshaṇa (English translation and Notes) ; 3, Kátantra (introduction) ; 4, Suśruta Samhitá (English translation) ; 5, Muntakhab-ut-Tawáríkh, Vol. II, (English translation) ; 6, Ápastamba S'rauta Sútra (Text) ; 7, Manu Ṭíká Samgraha (Text) ; 8, Prithirája Rásau (Text) ; 9, Lalita-Vistara (English translation).

Of the following works sanctioned in previous years no fasciculi have as yet appeared :—

1. Bṛihaddevatá (Text) ; 2, Prákṛitádhyáya (Text and translation) ; 3, Charaka (English translation with notes) ; 4, Naqáid-ul Farazdaq-Jerir (Text with English translations in prose and verse) ; 5, Kála Viveka (Text) ; 6, Vedánta Sútra, Commentaries on, (Text) ; 7, Yoginí' Tantra (Text) ; 8, Karaṇa Grantha (Text) ; 9, Muntakhab-ul-Tawáríkh Vol. I. (English translation) ; 10, Táj-ul-Maásir (Text) ; 11, Táríkh-i-Wassaf (Text) ; 12, Tarikh-i-Yámini (English translation with notes) ; 13, Jñátádharmakathá and Vipáka Sútra (Text) ; 14, Saddharma Puṇḍaríka (Text) ; 15 Al Tabrízí's Commentary (Text) ; 16, Márkaṇḍeya Puráṇa (English translation) ; 17, Svayambhú Puráṇa (Text) ; 18, Baudháyaníya S'rauta Sútra and Hiraṇyakeśí S'rauta Sútra (Text) ; 19, Tuzak-i-Jeháng'írí (Text) ; 20, A'ín-i-Akbarí (English translation) ; 21, Riyázu-s-Saláṭín (Text and English translation) ; 22, Nyáyavindu, Ṭíká (Text in Sanskrit and Tibetan).

The following new work was sanctioned during the year for publication.

B. *Sanskrit Series.*

Bhaṭṭotpala's Commentary on Varáha Mihira's Bṛihat Samhitá : Text, to be edited by Dr. G. Thibaut.

The following is a detailed list of the publications issued during 1888.

A. *Arabic-Persian Series.*

1. Iṣábáh, or the Biographical Dictionary of persons who knew Muḥammad, by Ibn Hájar, edited by Maulvi Abdul Hai. Nos. 264, 265, old Series, Vol. II. Fasc. XIII, XIV. Total *two* fasciculi. This completes the volume.

2. Maásir-ul-Umará, or Memoirs of Nobles, by Nawáb Samsám-ud-Daulah Sháh Nawáz Khán, edited by Maulvi Abdur Rahim of the Calcutta Madrasah. It is a Biographical Dictionary of the great nobles of the Mughal Court since the days of Akbar. Nos. 643, 648, 653, 656, 659,

Vol. I. Fasc. V, VI, VII, VIII, IX, Nos. 665, 669, 673, 679, 684, Vol. II. Fasc. I, II, III, IV, V. Total *ten* fasciculi.

3. Táríkh-i-Fíruz Sháhí', or the Annals of the reign of Fíruz Sháh of the Tughlaq Dynasty, by Shams i Siráj Afíf, edited by Maulvi Viláyat Hosain. This work is to be distinguished from the Táríkh-i-Firuz Sháhí, by Zíá-i-Barní. Nos. 662, 666, 680, 691, Fasc. I, II, III, IV. Total *four* fasciculi.

4. Zafarnámáh, or Book of Victory, an account of the wars of Tímúr, by Mauláná Sharf-ud-dín 'Alí, of Yazd, edited by Maulvi Muḥammad Ilhádád. Gibbon, who made use of a French translation of this work, says that its geography and chronology are wonderfully accurate. Nos. 646, 651, 660, 674, 683, Fasc. IV, V, VI, VII, VIII. Total *five* fasciculi.

B. *Sanskrit Series.*

5. Ashṭa-sáhasriká Prajñá Páramitá, or the Transcendental Knowledge of the Buddhists of the Maháyána School, in 8,000 slokas. The publication of this work has been completed under the editorship of Rájá Rájendralála Mitra, LL. D., C. I. E. The edition has been prepared from six manuscripts collected from various sources, of which the editor gives an account in the preface. In the introduction the editor gives an account of the various recensions of the Prajñá Páramitás. The present work treats of *Súnyatá* or the doctrine of the evolution of cosmos from vacuity. Nos. 645, 671, 690, Fasc. IV, V, VI. Total *three* fasciculi.

6. Aṇu Bháshyam, edited by Pandit Hemachandra Vidyáratna, is a *bháshya* commentary on the Vedánta Aphorisms of Bádaráyaṇa by Vallabháchárya, the founder of a Vaishnava sect in Western India who flourished about the year 1479. Vallabha considered the non-dualistic commentary of these Aphorisms, by Śamkaráchárya to be erroneous and founded a new School in which an attempt was made to reconcile the dualistic and non-dualistic theories in one harmonious whole. No. 637, Fasc. I. Total *one* fasciculus.

7. Advaita Brahma Siddhi, of Sadánanda Yati, an inhabitant of Kashmir, edited by Pandit Váman Śástrí, with notes and explanations in Sanskrit. An attempt has been made in this work to bring all the various philosophical schools into harmony by rejecting every thing in them which is opposed to the Vedas. The chapters of the work are called *Mudgaraprahára* or blows with a club on the head of the writer's opponents. Nos. 661, 698, Fasc. I, II. Total *two* fasciculi.

8. Vṛihad-dharma Puráṇa, edited by Pandit Haraprasád Śástrí. This is a system of mythology and tradition indicating the latest phase

of the development of the Puranic literature ; the principal interlocutors being Vyása and Jábáli; and Jayá, Vijayá and the goddess Durgá. No. 668, Fasc. I. Total *one* fasciculus.

9. Chaturvarga Chintámaṇi, Volume III, Part I, S'ráddha-kalpa, has been completed this year under the joint editorship of Pandits Jogeśvara Smṛitiratna and Kámákhyá Náth Tarkavágíśa. The author of the work is Hemádri, who flourished in the court of Mahadeva, one of the Yadava Princes of Devagiri, in the Deccan, about the middle of the thirteenth century. The edition was prepared from three MSS. Volume III, Part II, Kála Nirnaya has been taken in hand by the same editors. Nos. 652, 675, Vol. III, Part I. Fasc. XVIII, Vol. III, Part II, Fasc. I. Total *two* fasciculi.

10. Kála Mádhava, edited by Mahámahopádhyáya Chandrakánta Tarkálankára, is an astrological treatise by Mádhaváchárya for the determination of the proper time for various rituals of the Hindus. The work is a sort of an appendix to Mádhava's commentary on the Institutes of Parásara, and it treats of the time for the performance of rituals mentioned in it. The work has been completed this year. No. 676, Fasc. V. Total *one* fasciculus.

11. Kúrma Puráṇa, edited by Bábu Nílmaṇi Mukerji, M. A., Professor of Sanskrit, Presidency College, is a system of Hindu mythology and tradition advocating devotion to Vishnu. This work shows a phase of Puranic literature chronologically intermediate between the Vishnu, Agni and other older Puraṇas on the one hand and the Bṛihad-dharma and others on the other. Nos. 655 and 687, Fasc. VI, VIII. Total *two* fasciculi.

12. Madana Párijáta, edited by Pandit Madhusúdana Smṛitiratna, Professor of Smṛiti, Sanskrit College, Calcutta, is a digest of Hindu law later than the Chaturvarga Chintámaṇi, Mitákshará and Smṛiti Chandriká. The work was composed at a place named Kástha, a few miles towards the north of Delhi, on the Jamuná. Nos. 672, 686, 696, Fasc. II, III, IV. Total *three* fasciculi.

13. Nirukta, edited by Pandit Satyavrata Sámaśramí, with commentaries, has been completed in four volumes. The first volume, or the Nighantu chapter, was accompanied with the commentary of Devarája Yajvá, and the other volumes with that of Durgáchárya. The editor has given exhaustive indices of words at the end of each volume. It is a work of the highest authority on the Vedic philology. No. 664, Vol. IV Fasc. V. Total *one* fasciculus.

14. The work of editing the Nyáya Kusumánjali Prakaraṇam, of Udayana, who was termed the Nyáyáchárya or the great teacher of the Nyáya philosophy, has been taken in hand by Mahámahopádhyáya Chan-

drakánta Tarkálankára, Professor, Sanskrit College, Calcutta. This is a very different work from the Kusumánjali Kárika edited some time ago by Mr. E. B. Cowell. That work is in verse but this is entirely in prose. The work is accompanied with the commentary entitled *Prakáśa*, by Vardhamána, the commentary again being explained by extracts from the gloss entitled *Makaraṇda* by Ruchidatta. This is a work of the highest authority in the Nyáya School of Philosophy, having for its object the determination of the nature of *mukti*. Nos. 689, 695, Fasc. I, II. Total *two* fasciculi.

15. Paráśara Smṛiti, edited by the same learned professor, is the text of Paraśara as commented upon by the great Mádhaváchárya. The first volume of the work treats of the *Achára Káṇḍa*, and the second of the *Práyaśchitta Káṇḍa*. The first volume has not yet been completed. Nos. 649, 678, Fasc. VI, VII. Total *two* fasciculi.

16. Sámkhya Sútra Vṛitti, edited with indices by Dr. Richard Garbe, Professor of Sanskrit in the University of Königsberg, consists of two rare commentaries of the Saṃkhya Aphorisms by Aniruddha and Vedanti Mahádeva. Though the commentaries are not very old, yet they throw much light on the history of the Sáṃkhya Philosophy. Aniruddha appears to be older than Vijñánabhikshu whose work in fact has cast Aniruddha into the shade. Mahádeva is later than Vijñánabhikshu and has made very good use of his work. The learned editor has given only the original parts of Mahádeva's comments. No. 688, 692, Fasc. I, II. Total *two* fasciculi.

17. The first volume of Sámkháyana Śrauta Sútra, edited by Dr. Alfred Hillebrandt, of Breslau, containing the text and indices, has been all but completed. The various indices of Vedic quotations are exceedingly valuable. In the preface the learned editor says that the home of the Sankhayanins was Northern Guzerat, and that the Sútras contain a very large number of interpolations. In the second and subsequent volume the editor intends to publish the commentaries to the work. No. 667, Vol. I, Fasc. VI. Total *one* fasciculus.

18. Śrí' Bháshyam, a Vaishnava commentary on the Vedánta Aphorisms of Vádaráyaṇa by Rámánuja, edited by Pandit Rámnath Taṛkaratna. The peculiar doctrine taught by Ramanuja, a great teacher who appeared in Southern India in the thirteenth century, is what is called the Viśishṭádvaitaváda, a peculiar form of Advaitaváda. No. 658, Fasc. I. Total *one* fasciculus.

19. Tattva Chintámaṇi, edited by Pandit Kámákhyánáth Tarkavágíśa, is the standard work on the Nyáya philosophy in the Schools of Mithila and Bengal. It was composed about 500 years ago by Gangeśopádhyáya, and is a complete work on the various logical proofs. It is

complete in four parts treating of Perception, Inference, Analogy and Tradition. The work was accompanied with the commentary of Mathuránátha, which has the rare merit of really elucidating the text. But as after the publication of the seventh fasciculus, the MSS. of the commentary became almost unprocurable, Jayatírtha's commentary, entitled *Áloka*, was substituted for it. The ninth fasciculus brings the Pratyaksha-khaṇḍa, or the chapter on perception, to a close. The 10th goes on with the chapter on Inference, the most important chapter in Hindu Logic. Nos. 663, 682, Fasc. IX, X. Total *two* fasciculi.

20. TULSI' SATSAI', or Seven Hundred Verses by Tulsí Dás, the author of the Hindí Rámáyaṇa, edited by Pandit Bihárílál Chaube, under the supervision of Dr. Hoernle and Mr. Grierson. This is a very important work from a philological point of view, as it is one of the very few works written in mediæval Hindí. The work treats of Ráma, and each verse contains a separate riddle about him. Nos. 670, Fasc. I. Total *one* fasciculus.

21. UVÁSAGADASÁO, or the seventh Anga of the Jainas, on the rules of conduct of Jain laymen. The Prákṛita text is accompanied with the Sanskrit commentary of Abhayadeva, an English translation by the Editor, and copious notes for the purpose of elucidating technical terms and obsolete Prákṛit words. One more fasciculus, containing an index of the prakṛit words and an account of the MSS. used, will complete the edition. No. 697, Fasc. V. Total *one* fasciculus.

22. VARÁHA PURÁṆA, A System of Mythology and Tradition inculcating devotion to Vishṇu, edited by Pandit Hṛishi Kesha Śástrí Professor, Sanskrit College, Calcutta. Nos. 647, 654, 677, 694, Fasc. V, VI, VII, VIII. Total *four* fasciculi.

23. VÁYU PURÁṆA, A system of Hindu Mythology and Tradition, said to have been uttered by Váyu, edited by Rája Rájendralála Mitra, LL. D., C. I. E. The work has been completed this year. The editor has given a preface in which he says that the work is often identified with the Śiva Purána. No. 181, Vol. II, Fasc, VII. Total *one* fasciculus.

24. VṚIHANNÁRADÍYA PURÁṆA, an *Upa* or Minor Purána, A System of Mythology and Tradition, edited by Pandit Hṛiśi Keśa Śastri. No. 685, Fasc. V. Total *one* fasciculi.

### C. *Tibetan Series.*

25. SHER-PHYIN, edited by Bábu Pratápachandra Ghosha, is a Tibetan translation, word for word, of the Prajñápáramitá of one hundred thousand verses. It is a work on the transcendental philosophy of the Nepalese Buddhists of the Maháyána School. Nos. 650, 701, Vol. I, Fasc. I, II. Total *two* fasciculi.

26. Avadána Kalpalatá, edited with its Tibetan translation *Rtogs brjod dpag bsam khri śiń*, by Bábu Saratchandra Dás, C. I. E. and Pandit Harimohan Vidyábhúshaṇ, Oriental Librarian to the Asiatic Society of Bengal. The first volume of this work was lost in India for some centuries and has been lately recovered by Bábu S. C. Das from Lhassa. The work was written by Kshemendra, a voluminous poet of Kásmír, who, though a Hindu, wrote this work at the request of a Buddhist friend Nakka. No. 693, Vol. I, Fasc. I. Total *one* fasciculus.

*List of all Societies, Institutions, &c., to which the Publications of the Asiatic Society have been sent during the year, or from which Publications have been received.*

* Societies, &c., which have received the Asiatic Society's publications, and have sent their publications in return.

† Societies, &c., which have received the Asiatic Society's publications, but have sent none in return.

§ Societies, &c., whose publications have been received, but to which nothing has been sent in return.

* Allahabad :—Editor, Pioneer.
* Amsterdam :—Royal Zoological Society.
* ———— :—Royal Academy of Sciences.
* Angers :—Société d' E'tudes Scientifiques d' Angers.
* Baltimore :—Johns Hopkins University.
* Batavia :—Society of Arts and Sciences.
§ ———— :—Magnetic and Meteorological Observatory.
* ———— :—Kon. Natuurkundige Vereeniging in Nederlandsch-Indië.
* Berlin :—Royal Academy of Sciences.
† Berne :—Société Suisse d' Entomologie.
§ Birmingham :—Birmingham Philosophical Society.
* Bombay :—Bombay Branch, Royal Asiatic Society.
* ———— :—Anthropological Society.
* ———— :—Editor, Indian Antiquary.
* ———— :—Editor, Times of India.
* ———— :—Natural History Society.
* Boston :—Natural History Society.
§ ———— :—American Philological Association.
* Bordeaux :—L' Académie Nationale des Sciences, Belles-Lettres et Arts.
§ ———— :—Société de Géographie Commerciale.
* ———— :—Société Linnéenne.
* Brisbane :—Royal Society of Queensland.
* Brookville :—Society of Natural History.
* Brunswick :—Verein für Naturwissenschaft.

* Brussels :—L' Académie Royal des Sciences.
* ——— :—Musée Royal d' Histoire Naturelle de Belgique.
* ——— :—Société Entomologique de Belgique.
* ——— :—Société Royale Malacologique de Belgique.
§ Buda Pest :—Royal Hungarian Academy of Sciences.
* Buenos Ayres :—Museo Nacional.
* ——— :—Academia Nacional de Ciencias de la Republica Argentina.
* Calcutta :—Agri-Horticultural Society of India.
* ——— :—Geological Survey of India.
* ——— :—Editor, Englishman.
* ——— :—Editor, Hindu Patriot.
* ——— :—Editor, Indian Daily News.
* ——— :—Indian Mirror.
* ——— :—Indian Museum.
† ——— :—Mahommedan Literary Society.
* ——— :—Public Library.
* ——— :—Survey of India.
* ——— :—Tuttobodhini Shova.
† ——— :—University Library.
* Cambridge :—University Library.
* Cassel :—Der Verein für Naturkunde.
* Cherbourg :—Société Nationale des Sciences Naturelles.
* Christiana :—University Library.
* Colombo :—Ceylon Branch, Royal Asiatic Society.
* Copenhagen :—La Société Royale des Antiquaires du Nord.
† Cuttack :—Cuttack Library.
* Danzig :—Naturforschende Gesellschaft.
* Dehra Dun :—Great Trigonometrical Survey.
* Dublin :—Royal Dublin Society.
* ——— :—Royal Irish Society.
§ ——— :—Geological Society of Dublin.
* Edinburgh :—Royal Society.
* ——— :—Scottish Geographical Society.
§ ——— :—Botanical Society.
* Florence :—Società Italiana di Anthropologia e di Etnologia.
* ——— :—Società Africana d' Italia.
* Frankfurt :—Naturwissenschaftlichen Verein.
* ——— :—Senekenbergische Naturforschende Gesellschaft.
* Geneva :—Société de Physique et d' Histoire Naturelle.
* Genoa :—Museo Civico di Storia Naturale.
* Giessen :—Oberhessische Gesellschaft für Natur und Heilkunde.
* Graz :—Naturwissenschaftlicher Verein für Styria.

§ Hague :—Koninklijk Instituut voor de Taal-Land-en Volkenkunde van Nederlansch-Indië.
* Hamburgh :—Naturhistoriches Museum zu Hamburgh.
* ——— :—Naturwissenschaftlicher Verein.
* Halle ;—Deutsche Morgenländische Gesellschaft.
* ——— :—Die Kais. Leopoldinisch-Carolinische Akademie.
* Hamilton :—Hamilton Association (Canada).
§ Harrisburgh :—Second Geological Survey of Pennsylvania.
* Havre :—Société de Géographie Commerciale du Havre.
* Helsingfors :—Societas pro Flora et Fauna Fennica.
* ——— :—Société des Sciences de Finlande.
§ Ithaca (U. S. A.) :—Cornell University.
* Königsberg :—Die Physikalisch-Oekonomische Gesellschaft.
* Lahore :—Editor, Civil and Military Gazette.
§ ——— :—Anjuman-i-Panjab.
* ——— :—Agricultural Society.
† Leyden :—Royal Herbarium.
* Liége :—La Société Géologique de Belgique.
* ——— :—La Société des Sciences.
* Liverpool :—Literary and Philosophical Society.
* London :—Anthropological Institute.
* ———- :—Editor, Academy.
* ——— - :—Editor, Athenæum.
* ———- :—British Museum.
* ———- :—Geological Society.
* ———- :—Institution of Civil Engineers.
* ———- :—Institution of Mechanical Engineers.
* ———- :—Editor, Nature.
* ———- :—Linnean Society.
* ———- :—Royal Asiatic Society of Great Britain and Ireland.
* ———- :—Royal Astronomical Society.
* ———- :—Royal Geographical Society.
* ———- :—Royal Institution.
* ———- :—Royal Microscopical Society.
* ———- :—Royal Society.
* ———- :—Society of Electrical Engineers.
* ———- :—Statistical Society.
* ———- :—Zoological Society.
* Lyons :—La Société d' Agriculture, d' Histoire Naturelle et des Arts Utiles.
* ——— :—Muséum d' Histoire Naturelle.
* ——— :—Musée Guimet.

* Lyons :—La Société d' Anthropologie.
† Madras :—Literary Society.
* ———— :—Government Central Museum.
* Manchester :—Literary and Philosophical Society.
§ Melbourne :—Royal Society of Victoria.
* Mendon, Ill. :—Editor, American Antiquarian and Oriental Journal.
* Mexico :—Sociedad Cientifica "Antonio Alzate."
* Moscow :—Société Impériale des Naturalistes.
* Munich :—K. Bayerische Akademie der Wissenschaften.
* Naples :—Societa Africana d' Italia.
* New Haven :—Connecticut Academy of Arts and Sciences.
* ———— :—American Oriental Society.
* Newport (R. I.) :—Natural History Society.
* Ottawa :—Geological and Natural History Survey of the Dominion of Canada.
* Oxford :—Bodleian Library.
† ———— :—Indian Institute.
* Paris :—La Société de Géographie.
* ———— :—National Library.
* ———— :—Société d' Anthropologie.
* ———— :—Société Asiatique.
† ———— :—Société Zoologique.
* ———— :—Société Académique Indo-Chinoise.
* Philadelphia :—Academy of Natural Sciences.
§ ———— :—American Philosophical Society.
* Pisa :—Società Toscana di Scienze Naturali.
§ Prague :—K. K. Sternwarte.
* Rio de Janeiro :—Museo Nacional.
* Rome :—Societá degli Spettroscopisti Italiani.
* Santiago :—Sociedad Cientifica Alemana.
* St. Petersburgh :—Comité Géologique.
† ———— :—Imperial Library.
* ———— :—Société Impériale Russe de Géographie.
* ———— :—Académie Imperiale des Sciences.
* ———— :—Le Jardin Imperial de Botanique.
* San Francisco :—Californian Academy of Arts and Sciences.
* Schaffhausen :—Schweizerischen Entomologischen Gesellschaft.
* Shanghai :—North China Branch, Royal Asiatic Society.
* Simla :—United Service Institution of India.
* Stettin :—Entomologischen Verein.
* Stockholm :—Kongl : Svenska Vetenskaps Academiens.
* Sydney :—Royal Society of New South Wales.

* Sydney :—Linnæan Society of New South Wales.
* Tokyo :—Imperial University of Japan.
* Toronto :—Canadian Institute.
* Trieste :—Società Adriatica di Scienze Naturali.
* Turin :—Reale Accademia delle Scienze.
† Ulwar :—Ulwar Library.
* Vienna :—Anthropologische Gesellschaft.
* ——— :—K. K. Akademie der Wissenschaften.
§ ——— :—K. K. Central-anstalt für Meteorologie und Erdmagnetismus
* ——— :—K. K. Geologische Reichsanstalt.
* ——— :—K. K. Zoologisch-Botanische Gesellschaft.
* ——— :—K. K. Naturhistorichen Hof-Museum.
* Washington :—Commissioners of the Department of Agriculture.
* ———— :—Smithsonian Institution,
§ ———— :—U. S. Army Signal Service.
* ———— :—United States Geological Survey.
§ ———— :—U. S. Coast and Geodetic Survey.
* Wellington :—New Zealand Institute.
* Württemberg :—Natural History Society.
* Yokohama :—Asiatic Society of Japan.
* ———— :—Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens.
* Zagreb :—Arkeologickoga Druztva.

## Abstract of Proceedings of Council during 1888.

*January 26th, Ordinary Meeting.*

A copy of the *Orientalische Bibliographie*, a new publication in place of the *Literature Blat für Orientalische Philologie*, the publication of which has been discontinued, was subscribed for.

An offer from Professor Cowell to revise the translation of the *Muntakhab-ut-Tawárikh* was accepted, and he was authorised to postpone the translation of Khafi Khan.

Read a letter from Mr. F. E. Pargiter stating that he will be happy to complete the translation of the *Márkandeya Puráṇa* without notes, but will add such notes as may suggest themselves in the course of the work.

The Government of Bengal was informed, in reply to an enquiry made by the Government of India whether the entire cost of purchasing a complete set of the *Tangyur* from Tibet could not be met from the Government grants made to the Society, that the charge for the purchase could only be met from the Oriental Publication Fund, and that in the

opinion of the Council it would not be possible to meet the entire cost of purchasing the Tibetan work from the balance of that Fund.

A letter from the Assistant Surveyor, Survey of India Dept., reporting that in consequence of new rules for debiting all work done in the office cash payment will be required in future for all drawings made or photographic work done on account of the Society, was recorded.

On an application from Babu Saratchandra Dás it was resolved that the Cambridge University should be asked for the loan of the two Manuscripts of the *Bodhisatvá avadána kalpaláta* in the University Library, to help him in editing that work.

An exchange of publications (Journal, Part II) with the College of Medicine, Imperial University of Japan, was sanctioned.

An enquiry from the Superintendent, Baptist Mission Press, regarding the rate to be allowed for printing Tibetan works was left to the Philological Secretary for settlement.

It was resolved that the future fasciculi of the *Maásir-ul-Umara* should be printed in demi octavo instead of royal octavo size.

It was ordered that 600 copies of the catalogue of Burmese Manuscripts should be printed, and also the same number of the catalogue of Tibetan Manuscripts.

The Council approved of the proposed triangular shape for the new durwan's lodge, the position selected for it not admitting of the erection of a square building.

*March 1st, Ordinary Meeting.*

A letter from Major H. G. Raverty, offering to contribute articles to the Society's Journal if proofs of his papers could be sent to him, was referred to the Philological Secretary.

An exchange of publications with the Imperial Botanic Gardens, St. Petersburg, was sanctioned.

On the recommendation of the Philological Secretary a copy of certain Sanskrit works published by Moheschandra Paul was subscribed for.

An application from the Ceylon Branch of the Royal Asiatic Society, for a copy of Rules and Regulations was complied with.

Maulvi Kabir-ud-din Ahmed having offered to continue the printing of the *Maásir ul-Umara*, in royal 8vo. size at a reduction of Rs. 36 per fasciculus, on the understanding that the reduced charge was to be confined to that work, it was decided to accept the offer.

A letter was received from the Government of Bengal intimating that the Government of India could not sanction a grant from Imperial funds in the present state of the Finances, towards purchasing a com-

plete set of the *Tangyur* from Tibet, and that the Lieutenant-Governor was also precluded from sanctioning an additional grant but had no objection to the whole cost being met from the Oriental Publication Fund, if it could be managed. The matter was referred to the Finance Committee for report.

Read a letter from the Editor of Indian Notes and Queries stating that he has been compelled to discontinue the publication of that work owing to pressure of official business.

The several Committees for 1888 were appointed.

On the recommendation of the Philological Committee Dr. G. Thibaut was appointed to edit Bhaṭṭotpálás commentary on Varáha Mihirá's Bṛihat Saṃhita.

The Philological Secretary was authorised to arrange with a private Engraver for printing a plate of some coins required for the Proceedings.

A bill for Rs. 263-4, for drawings executed at the Survey of India office was passed.

Messrs. Meugens and King were re-appointed Auditors for the current year.

*March 29th, Ordinary Meeting.*

A proposal by the Natural History Secretary, and seconded by the Philological Secretary, that elections to Corresponding Membership should be revived, and that such Members should henceforth receive the publications of the Society, was circulated to the Council for consideration.

The purchase of a collection of coins offered for sale by Mr. J. G. Delmerick for Rs. 250 was sanctioned, some of the coins being very rare.

An agreement on stamp paper for the erection of an iron railing with two gateways along the southern boundary of the Society's premises, was signed by the Contractor and the General Secretary.

On the recommendation of the Natural History Secretary permission was granted to the Microscopical Society of Calcutta to hold their meetings in the Society's rooms, and it was resolved that such papers read before the Society as seemed to have a scientific value should be accepted for publication in the Journal, on the condition that the papers were brought up at the monthly meetings.

A specimen proof of the first form of the new Persian Catalogue was approved. The edition to consist of 500 copies, royal 4to. cost Rs. 3-8 per page.

A recommendation by the Philological Secretary to subscribe for

a copy of a new work called the "Epigraphia Indica and Record of the Archæological Survey of India," to be published quarterly, was postponed.

The price of the new Tibetan work "Sher-Phyin" was fixed at one rupee per fasciculus, for the present.

A proposal to subscribe for a copy of the "Asiatic Quarterly Review" was negatived.

The old beams remaining over from the late repairs were sold for Rs. 112.

A paper on "Benares Kinkob" received from Rajchandra Sanyal, Librarian, Benares College, was returned to the Author, not being suitable for the Society's publications.

*April 26th, Ordinary Meeting.*

An exchange of publications with the *Verein für Naturwissenschaft Zu Braunschweig* was declined.

A letter of congratulation was written to the *Société des Sciences de Finlande* in commemoration of the 50th Anniversary of its foundation.

The completion of Part III of Atkinson's *Lepidoptera* was reported by Mr. W. T. Blanford, by whom the work had been supervised after the death of Mr. A. Grote, the total cost being £155-9-9, leaving a balance of £6-6-9 out of the sum of £161-16-6 remitted to London in September 1886 for the publication of the work.

It was resolved, on the report of the Physical Science Committee, to take steps for investigating into the cause of the explosive sounds known as the "Barisal Guns."

Read letters from the Superintendent, Baptist Mission Press, agreeing to accept Rs. 3-8 a page, *provisionally*, ultimately reducible to Rs. 3-3, for printing Tibetan works, royal 8vo, and Rs. 5-4 a page, 4to, for Arabic works, with vowel points. Both changes to include "doing up," as well as printing and paper.

*May 31st, Ordinary Meeting.*

On an application from the American Philological Society of Philadelphia inviting the co-operation of the Asiatic Society in perfecting a universal language for learned and commercial purposes, based on the Aryan vocabulary and grammar in their simplest forms, a reply was sent intimating the willingness of the Society to assist as far as possible, but that a special delegate could not be sent to represent the Society at the congress which was proposed to be held.

An application from the *Società Africana d' Italia*, Naples, to be supplied with Part I of the Journal, in addition to Part II, was negatived.

On an enquiry from the Government of India, Home Department, whether the literary qualifications of Monsieur S. Levie, of the School of High Studies at the Sorbonne, Paris, were such as to entitle him to be placed on the list of Savants to whom copies of the Catalogues of Sanskrit Manuscripts are sent, a reference was made to the French Consul at Calcutta.

In reply to a letter from the Engineer to the Calcutta Corporation stating that the water channels across the new entrances to the Society's premises could not be improved without altering the levels of the road-side channels, and building at least one new gully pit, at a cost of Rs. 60, which the Society would be called upon to pay, he was asked whether the ordinary iron gateway tubes could not be supplied at the Society's expense.

The Literary and Historical Society of Quebec having expressed a wish, through the Government of India, to exchange publications with Societies in India, a number of each part of the Journal was sent, and specimen copies of their publications asked for in return, to decide whether an exchange should be made.

An exchange of publications (Journal, Part II) with the Entomological State Museum, Stockholm, was sanctioned.

Permission was accorded to the Theosophical Publication Fund Society of Bombay to reprint the English translation of 12 Upanishads originally published in the Bibliotheca Indica series, which had been out of print for some years.

The Baptist Mission Press was authorised to make an extra charge of one anna per page for "doing up" Tibetan works, in addition to the rate of Rs. 3-8 per page for printing previously sanctioned.

On the recommendation of the President a visiting Committee was formed, consisting of the officers and one or two members of Council, to meet whenever necessary for the inspection of the Office, Library, Stock, &c.

It was decided that there was no necessity to revive the election of Corresponding Members at present.

An offer from Professor Duncan to undertake the determination and description of the collection of the Ophinroidea and Echinoidea, recently dredged up on board the "Investigator," was accepted.

Authority was given to Mr. V. A. Smith to use the negatives of the plates attached to his paper on Gupta gold coins published in the Journal, Part I, for 1884, and to reprint so much of the text as might be necessary in preparing a comprehensive Monograph of all the Gupta coins, on which he was engaged.

The Baptist Mission Press was directed to revert to the use of blue paper for the cover of the Society's Proceedings.

Intimation was received from Messrs. Trübner & Co. of the dispatch of the copies of Part III, of Atkinson's Lepidoptera.

On the recommendation of the Library Committee certain books were ordered to be purchased, and the re-grant of the sum of Rs. 1,000 for binding the principal periodicals was sanctioned.

An estimate of Rs. 47 was sanctioned for levelling the ground by the east gate, and for sand plastering and color washing the remaining portion of the compound wall in Park Street.

*June 28th, Ordinary Meeting.*

The Agri-Horticultural Society of Burmah was authorized to subscribe to the Society's publications on the usual terms.

Two copies of Mr. E. Blyth's catalogue of the Mammals and Birds of Burmah were presented to the Library of the Indian Museum.

A requisition from the Government of India, Home Department, for a report showing the progress made since 1883 in the search for Sanskrit Manuscripts in the Lower Provinces of Bengal was referred to Dr. R. Mitra.

Dr. D. D. Cunningham was appointed a Member of the Council, and a Trustee of the Indian Museum on behalf of the Asiatic Society in the place of Mr. E. T. Atkinson, who had become a Trustee on behalf of the Museum by virtue of his official position as Accountant General, Bengal.

Instructions were issued to the Engineer to the Calcutta Corporation to have the necessary alterations carried out to remedy the defect of the carriage way at the entrances of the new gateways in accordance with his recommendation.

The purchase of certain books for the Library was sanctioned on the recommendation of the Library Committee.

A suggestion that all papers requiring plates should be published in the Journal in order not to delay the Proceedings was referred to the Secretaries.

It was announced that Professor Cowell was engaged with Professor Lowe in revising the translation of "*Muntakhab-ut-Tawárikh.*"

Rules for the grant of leave &c. to the office establishment were sanctioned.

*July 26th, Ordinary Meeting.*

Intimation was received from the Secretary of State that Her Majesty the Queen, Empress of India, had been graciously pleased to accept the address presented by the Society on the occasion of Her Majesty's Jubilee.

A representation from Messrs. Trübner & Co. for an increase in the rate of discount allowed them for the sale of the Society's publications was ordered to be circulated to the Council.

On an application from the Rev. Mr. Sandberg for the loan of two volumes of the Tibetan Xylograph *Ka-gyur M.do* it was decided that the books could be lent out if Mr. Sandberg would sign a bond of indemnity for Rs. 300, and pay all postage and insurance charges.

An old portrait in oil colours sent by the Hon'ble Mr. Quinton for identification was returned to the Commissioner of Allahabad in compliance with Mr. Quinton's request.

A letter from the Solicitor to Government stating that the Manuscripts belonging to the estate of the late ex-King of Oudh were with Colonel Jarrett for the preparation of a Catalogue, was recorded.

The price of the colored copies of Atkinson's *Lepidoptera*, Part III, was fixed at Rs. 6.

On the recommendation of the Philological Secretary it was resolved to engage a Tibetan from Darjeeling to assist Babu P. C. Ghosha in editing the Sher-Phyin, and to look after the Tibetan books in the Society's Library.

*August 30th, Ordinary Meeting.*

On an application from Dr. W. A. Conklin, a copy of Part II of the Journal was ordered to be given in exchange for the Journal of Comparative Medicine and Surgery, it being understood that the Journal would be deposited in the Library of the New York Zoological Gardens.

Intimation was received of the death of Salvatore Tommasi, President of the Società Africana d' Italia, Naples.

Under instructions from the Government of India, Home Department, the name of Monsieur S. Levie was entered in the list of persons to whom Catalogues of Sanskrit Manuscripts are sent.

Certain Sanskrit Manuscripts in the Government collection were authorised to be lent to Mr. Apte, Pleader of the High Court, Bombay, on the conditions named by that gentleman.

Mr. G. G. Palmer was authorized to make a copy for himself of the oil painting by Geo. Morland in the Society's collection, he having promised to clean and varnish the painting before returning it.

A reprint of the Rules of the Society was ordered.

The application from Messrs. Trübner & Co. for an increase of commission on the sale of the Society's publications was referred to a Sub-Committee.

It was decided to hold a meeting of the Society in the month of September.

An exchange of Part II of the Journal was sanctioned with the following Societies: Entomological Society "Iris," Dresden, Gesellschaft des Naturforschenden Freunde, Berlin.

The Baptist Mission Press agreed to supply, without extra charge, paper weighing 20lbs. to the ream for printing the Bibliotheca Indica publications.

The following estimates were sanctioned:

For renewing beams and burgahs, &c, on the ground floor and general repairs to the building, Rs. 3,855-8.

For thorough repairs to the out offices, Rs. 343-10-6.

For putting wire netting to the windows of some of the rooms on the ground floor, fitting brass bolts with hasps to all the windows and supplying padlocks, Rs. 172-8.

*September 27th, Ordinary Meeting.*

The subscription of ten guineas to the Pali Text Society was sanctioned for a further period of six years, but a proposal from the Secretary to the Society to exchange advertisements with the Royal Asiatic Society of Great Britain and Ireland was declined.

A letter was read from the Société d' Anthropologie, Paris, intimating that the Society had been assigned a place in the Exposition of the Minister of Public Instruction in 1889 and asking all persons who desire to take a part therein to communicate with the Committee of Organisation.

An application from Dr. L. G. Wirth, of Alexandria, to be admitted a Member of the Society without paying any fee was declined.

A letter from the Government of the N.-W. P. and Oudh offering 46 photographic plates of Archæological remains in the Jhansi district on condition of receiving two copies of each photograph struck off, was referred to the Trustees of the Indian Museum.

The Collector of Hooghly was authorized to have a copy made of an old Dutch plan of Hooghly from a book in the Society's Library.

The Geographical Society of Paris was furnished with the names of certain persons in India to whom invitations might be sent to attend the Geographical Congress to be held at Paris in 1889.

An offer from the Microscopical Society of Calcutta of an Honorary Membership in that Society to the President of the Asiatic Society of Bengal was accepted.

An additional expenditure of Rs. 39 for half terracing the roof of one of the godowns, for which no provision had been made in the estimate, was sanctioned.

*November 1st, Ordinary Meeting.*

An exchange of publications with the Literary and Historical Society of Quebec was declined.

The presentation from the Government of India, R. and A. Dept. of a set of 56 photographs of the paintings in the cases of Ajunta taken from March 1884 to April 1885, was announced.

The Government of the N.-W. P. and Oudh was informed that the Trustees of the Indian Museum would accept the photographic plates of Archæological remains in the Jhansi district offered to the Asiatic Society.

It was resolved to subscribe for a copy of a work on the Ornithology of Turkestan and the adjacent countries, to be published by Dr. Menzbier of the University of Moscow.

The report prepared by Dr. Rájendralála Mitra regarding the progress made in the search for Sanskrit Manuscripts in the Lower Provinces of Bengal called for by the Government of India was ordered to be forwarded to Government.

On the recommendation of the Library Committee certain books were ordered to be purchased for the Library.

Two rooms on the ground floor were placed at the disposal of the Photographic Society for their exhibition during a week or two in the cold weather.

Dr. W. King accepted the office of Treasurer in the room of Mr. A. Pedler, who had been obliged to resign on account of ill health and pressure of official duties.

*November 30th, Ordinary Meeting.*

The loan of the oil painting of Warren Hastings in the Society's collection was made to Mr. G. G. Palmer, for the purpose of making a copy for himself, on the understanding that it was not for sale, and that the painting would be cleaned thoroughly and varnished before return.

Under instructions from the Government of India the name of Monsieur Charles Michel, Professor of Sanskrit at the University, Belgium, was placed on the list of persons to whom copies of the Notices of Sanskrit Manuscripts are sent.

On an application from Mr. J. Cockburn for the assistance of the Society in his proposed exploration of the bed of the river Jumna for fossils, Dr. W. King and the Natural History Secretary were asked to give Mr. Cockburn all possible assistance.

It was decided that there was no present necessity for making any alteration in the Rules regarding the rate of subscription of Foreign Members.

The question of the steps to be taken regarding the cracks in the south wall of the Society's Meeting room was referred for settlement to the Building Committee.

A copy of the Persian Manuscript "Shah Tamasp" was lent to Dr. Paul Horn of Halle, the Royal Library at Berlin having undertaken to receive it into safe custody during the period of loan, and a similar arrangement was sanctioned with regard to Manuscript No. 273 for Professor Hillebrandt in connection with the edition of the "Hiranyakesin Srauta Sutra," which he is preparing for the Bibliotheca Indica, provided the University Library at Breslau would agree to keep it in safe custody.

The purchase of a copy of the work named "Hymnen des Rigveda" edited by Professor Herman Oldenberg, was sanctioned on the recommendation of the Philological Secretary.

Lists were circulated to Council of the names of the Office Bearers and Members of Council for the ensuing year.

*December 20th, Ordinary Meeting.*

The Government of India was informed in reply to an enquiry whether any portion of the grant for the search for Sanskrit Manuscripts could be spared for the publication of the Reports of the Archæological Survey of India, that the Council was of opinion, that the search should be continued for a further period of 4 years and then cease, but meanwhile the grant should not be reduced.

Mr. J. Talboys Wheeler was informed in reply to an offer he made for the sale to the Society of his Manuscript copy of the Mahábhárata and Index for £60 that the copy was not required.

A letter was received from the Government of India forwarding a Medal presented to the Society by the Corporation of the City of London in connection with the Colonial and India Exhibition of 1886.

An application from the Directeur de la Feuille des Jeunes Naturalistes, Paris, for an exchange of publications was declined.

The thanks of the Council were conveyed to the Honorary Secretaries of the Photographic Society of India for the offer of the use of the reading room and dark room of the Society to any members of the Asiatic Society who may be interested in Photography.

On the recommendation of the Building Committee an estimate amounting to Rs. 299-10 was sanctioned for repairing the cracks in the south wall of the Society's Meeting Room.

With reference to a letter from Dr. Hening, Frankfurt, applying on behalf of the Naturwissenchaftlichen Vereins for a copy of the Journal in addition to the Proceedings, it was decided that the Journal could not be given.

The lists of Office Bearers and Members of Council for the ensuing year were approved.

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The Report having been read the President invited the Meeting to put any questions or offer any remarks which any member might think necessary in connection therewith.

No remarks having been offered the President moved the adoption of the Report. The motion was unanimously carried.

The PRESIDENT then addressed the Meeting.

## Address.

The Report of the Council which has just been read gives full details of the working of the Society during the past year and I trust you will consider it satisfactory. Judging by the flow of members and the number of papers that have been brought before us, there seems to be no diminution in the usefulness of the Society. The ordinary income and expenditure have been much as usual, the former showing, as it should, a fair balance in excess of the latter. We have, however, had very heavy expenditure to meet on account of the repairs and alterations of our premises, for which it has been necessary to sell out a portion of our capital from the Temporary Fund, and more will have to be sold out to meet present liabilities. It is, however, a great satisfaction to know that the substitution of a railing for the wall along Park Street and the other improvements made in clearing the compound of trees and vegetation, which stopped the proper ventilation of the house, have met with general approval both in and out of the Society. Now that these repairs have been completed, it is to be hoped that nothing more will be required in this way for some years to come, and we may be able to turn our attention to improvements in the Library, and other matters which have had to be postponed in consequence of the repairs.

We ought, however, to realise that our income is barely sufficient to meet these recurring extraordinary expenses in addition to the ordinary calls upon it, and that every effort should be made to increase our resources, to the extent of at least Rs. 1,000 per annum, by the influx of additional members and the exercise of due economy. It is a matter of great regret to me to see so few new standard works added to our Library, but the expenditure for keeping up our magnificent series of periodicals already exceeds the Budget grant allotted for the purchase of books.

Before proceeding further I must not omit to remind you of the obligations we are under to the officers of the Society, to whose zeal and devotion to the duties confided to them its successful working is entirely due. I know from experience how heavily these duties sometimes press in addition to the daily official work in a trying climate. Mr. Wood-Mason, the Natural History Secretary, and Dr. Hoernle, the Philological Secretary, have both devoted all their energies to the editing of their respective parts of the Journal. It is a matter of great regret that Mr. Pedler found himself obliged by the strain of official duties to give up the office of Treasurer which he had so efficiently held since May 1887. Still more recently our excellent and hardworking General Secretary, Mr. H. M. Percival, has had to resign his post for the same reason. The Treasurership was held for a short time after Mr. Pedler's resignation by Mr. A. Simson, and now Dr. W. King has kindly taken it over. To all these gentlemen and to our Vice-President, and late President, Mr. E. T. Atkinson, I desire to offer my warm personal acknowledgments for the help freely afforded me in presiding over the affairs of the Society, and I would also ask you to pass a cordial vote of thanks to them for their services to the Society during the past year. (*The vote was passed unanimously*). It was a great pleasure to see my old friend our Vice-President, and former President, Rájá Rájendralála Mitra, the Nestor of the Society, recently among us once more, and I trust we may hope for his entire restoration to health.

As already announced, Mr. C. Little, who will be balloted for as a new member this evening, has very kindly consented to undertake the duties of General Secretary.

Following the good custom of many of my predecessors, I propose to give a brief review of the progress of Science and Oriental literature in this country and its nearer border-lands during the past year. Such a review must, I know, be very incomplete and imperfect, owing to my inacquaintance with many of the subjects treated on, as well as to the large number of subjects, each of which would give good material for an address by itself, and the vastness of the area with which we have to deal. For we have not only to show our fellow-workers in other countries what is being done here ; but to many of our members residing in other parts of India, far from libraries of reference, it will be interesting to know what is being done elsewhere in connection with subjects coming within the scope of our enquiries. It is also well, I think, that we should periodically endeavour to sum up the progress we are making in carrying out the intentions of our founder, and continuing the labours of the many distinguished workers in the field of literature

and science, whose names have adorned our member rolls for upwards of a century.

Such work in India has to be performed for the most part under the greatest difficulties. The climate is ever trying, and official duties tend daily to press more heavily. Libraries too are few, and the appliances for scientific work difficult to obtain and to keep in good order.

We have as yet no class of leisured devotees of science, as in other countries, though it may be hoped that as time goes on, the seeds of the scientific education, now so liberally thrown broad-cast over the country, may produce good fruit. It is disappointing, however, to see from a recent resolution of the Government of Bengal, that this branch of education is making so little advance and that the science course is losing popularity in favour of more literary but less practical studies. For progress in the practical applications of science we have mainly to look to the Scientific Departments of the Government; for few of us have either the facilities or the leisure for carrying out independent researches of our own; and thus it has come about that experimental science occupies so small a place in our Journal, a fact greatly to be regretted, for the field of useful work is still large. It must be admitted, however, that there is much in favour of the centralisation of the results of the scientific work carried on under Government in various departments, so that enquirers in this or other countries may at once know where the information they are in search of is most likely to be found; the work is done more completely, and the continuity of the records of it thus secured is of the utmost importance.

For myself, though I should be the last to underrate the value of the admirable work our Society has done and is doing, I should be glad to see it occupy a more prominent position as the exponent and representative of scientific progress in this country and keep itself more in touch with the movements of the day in the direction of scientific and technical education, and the spread of scientific knowledge in its application to the practical requirements of the country. New Societies and new Journals are being started, some of them for objects quite within our scope. It is exceedingly gratifying to see this evidence of progress, but at the same time it seems to show that our Society does not sufficiently meet the requirements of the times, and it might be well for us to consider whether anything could with advantage be done to extend its usefulness by a re-arrangement of our Journals and the encouragement of branch Societies or Sections for special objects. This, however, is a subject upon which I cannot now enlarge.

As it would be quite impossible to deal with work going on all over the Continent of Asia, I propose to limit my remarks as far as possible

to subjects which have a more or less immediate connection with India, and even with that limit the field of enquiry is a vast one.*

Commencing with the principal work of our Society—

### Oriental Literature, History and Linguistic Studies.

I regret that other duties have, of late, prevented me from turning my attention to the study of Eastern literature and languages, ancient or modern. It would, in any case, however, have been far beyond my powers and opportunities to have tried to place before you a complete review of what has been accomplished during the year in the extension of the knowledge of Indian Literature and the prosecution of linguistic research, but Dr. Hoernle has kindly prepared for me a brief abstract which will, I hope, enable you to form some idea of what has been done in this direction by our own Society and other Societies in India, as well as in other lands. It is, however, peculiarly gratifying to me to see that these enquiries into the ancient literature, philosophy and languages of Asia are being prosecuted with undiminished interest and energy in all parts of the civilised world, and we may hope that in due time they will throw light on much that is now obscure in connection with the early religions and languages of mankind, as well as the early history of this country.

*Publications of the Society.*—Two numbers of the Journal, Part I, have been issued by Dr. Hoernle during the year, and in place of the two remaining numbers, an Extra Number will shortly appear which will contain Mr. G. A. Grierson's valuable "Materials for the Modern Vernacular Literary History of Hindústán." This work, which was originally compiled for the Seventh International Congress of Orientalists, at Vienna, will give more or less extended notices of not less than 952 poets of Hindustan, many of whom have hitherto been not even known by name.

Among the papers contained in the two quarterly numbers, the only one bearing on literature is by Bábú Sarat Chandra Dás "on the Sacred and Oriental Characters of Tibet." Mr. Beveridge contributes papers "on the Era of Lachhman Sen," which is mentioned by Abu-l-Faẓl, in the Akbarnámah, as commencing in 1119 A. D.; also on "Father Jerome Xavier," who stayed with the emperor Akbar for many years at Agra.

* I have to gratefully acknowledge the assistance received, in preparing this address and passing it through the press, from Dr. Hoernle, Dr. Burgess, Col. Thuillier, Dr. W. King, Messrs. Eliot and Pedler, Mr. C. H. Reynolds, Dr. G. King, Dr. D. D. Cunningham, Dr. J. Scully, Mr. E. T. Atkinson, and Mr. Wood-Mason. Also to Dr. Führer, Mr. A. Rea, Dr. Hendley, Mr. Basil Scott, Mr. J. F. Duthie, Mr. H. H. Risley, Mr. E. C. Cotes and Mr. Phipson for information kindly supplied.

He has, further, a note to a paper "on the mother of Jahángír," by Kaviráj Shyamal Dás.

*Bibliotheca Indica.*—This valuable series of publications has made greater progress than usual under the vigorous supervision of Dr. Hoernle, assisted by Pandit Hara Prasáda Sástrí. Fifty-eight fasciculi, the largest number ever published in a single year, were issued during the year and a complete list of them will be found in the Report of Council. Of these 34 belong to the Sanskrit, 21 to the Persian and 3 to the Tibetan series. The parts of the Sanskrit series are chiefly continuations of works commenced in previous years, but there are seven works newly begun. These are the *Sankhyá Sútra Vṛitti*, by Professor Garbe; the *Nyáya Kusumánjalí*, by Prof. Ch. K. Tarkálankár; the *Bṛihad Dharma Puráṇa*, by Pandit Hara Prasáda Sástrí; *Aṇu-Bháshyam*, by Pandit Hemachandra Vidyaratna; the *Srí Bháshyam*, by Pandit Rámanátha Tarkaratna; the *Advaita Brahma Siddhi*, by Pandit Vámana Sástrí Upádhyáya; also one Hindí work, the *Tulsí Satsaí*, by Pandit B. L. Chaube. In the Persian series also, most of the published fasciculi belong to continuations; but there is one new work, the *Taríkh-i-Fíróz Sháhí of Shams-i-Shiráj-i-'Afíf*, edited by Maulawí Viláyat Husain. Both works of the Tibetan series are new commencements. The publication of Tibetan works in the Bibliotheca Indica is a new departure, the importance and first beginnings of which have been fully detailed in the addresses of the two preceding years. The first fasciculus of the *Shér-phyn*, or the *Ashṭasáhasriká Prajñápáramitá*, was nearly finished at the time of the Annual Address of 1886, and a few pages of the *Pag Sam Khri-Siń*, or the *Avadána Kalpalatá*, were printed at the time of the Address of last year. Of the former work there are now two parts finished, and of the latter one.

*Catalogues.*—A Catalogue of our Persian and Arabic Manuscripts and prints or lithographs has been some time under preparation by Maulawí Mirza Ashraf Ali, of the Calcutta Madrasah, under the superintendence of Dr. Hoernle. The Persian portion is completed, and 52 pages are printed, a copy of which is placed on the table. The Arabic portion is far advanced towards completion.

*Search for Sanskrit MSS.*—A part of the work of searching for Sanskrit MSS.—that done in the province of Bengal—is carried on, in connection with our Society, by Rájá Rájendralála Mitra. The results of his search are recorded in the well-known "Notices of Sanskrit MSS." These have now reached their twenty-third number, which contains notices of 168 manuscripts, bringing the total of manuscripts hitherto described up to 3,240. The following remarks are summarised from the Rájá's interesting report, prefixed to Volume IX of his "Notices,"

which comprises the whole period from 1881-82 up to this year. The principal places visited for the purpose of the search were Benares, the chief towns of Tirhút, Rangpur and Dinájpur, Púrí in Orissa, and 'Aẓímganj, near Murshidábád. Benares and Tirhút, being ancient and flourishing seats of Sanskrit learning, yielded rich harvests. The search in Rangpur and Dinájpur was disappointing. In Púrí the richest collection, of over 1,200 works, is in the S'ankara Maṭha; but it contains nothing unique or exceptionally rare. But the most valuable results were obtained at 'Aẓímganj. This place is the seat of a large and affluent Jain community, which maintains several monasteries possessing more or less valuable collections of MSS. The most extensive and valuable library, however, of over 600 works, is in the possession of a private Jain gentleman, Rai Dhanápat Singh, whose name will be known to you in connection with his publication of a large number of Jain Sacred Books. In spite of the well-known reluctance of the Jains to allow the inspection of their literary treasures, Rájá Rájendralála Mitra succeeded not only in examining a portion of the Jain libraries, but also in purchasing a considerable number of Jain works. This class of literature was not much noticed until very recently. The first list of any larger dimension was published by the Rájá in his "Catalogue of Bickaneer MSS." This was followed by the lists contained in Professor Peterson's and Professor Bhandarkar's "Reports of the search in the Bombay Presidency," during the years 1883 to 1884, 1884 to 1886. It is particularly gratifying that the search for Jain MS. is now being taken up also in Bengal. The Bombay Government collection, having been begun earlier, is richer in Jain works, but a very respectable nucleus has now been formed for the Calcutta collection. Altogether Rájá Rájendralála Mitra has purchased 913 works, of which 94 are Jain. In his "Notices," which cover the period from 1881—1888 and which are included in the volumes VI—IX, a total of 1,260 works are described, many of which will appear new to Oriental scholars.

The search in the province of Oudh is entrusted to Pandit Deví Prasáda. His "Catalogue of Sanskrit Manuscripts" records the work done in 1888, and notices 316 manuscripts, including 3 Jain.

Of the operations, conducted in the Bombay Presidency by Professor R. G. Bhandarkar, we have received his "Report of the Search for Sanskrit Manuscripts during the year 1883-1884." It is a large volume with numerous extracts from selected manuscripts, described in the report. Its catalogue enumerates 737 manuscripts as purchased for Government. A noteworthy and valuable feature in it is the large space devoted to the description and discussion of manuscripts of the Jain literature, both of the Digambara and S'vetámbara sects.

In view of the interest that is growing up with regard to everything connected with Jainism, it is particularly satisfactory to note the increasing attention bestowed on the search for Jain MSS. In the three last volumes of the "Notices," there are described no less than 266 of these MSS., of which, as already stated, 94 have been acquired for the Government collection which is in the custody of the Society.

*Other Indian Societies and Journals.* The last number of the '*Journal of the Bombay Branch of the Royal Asiatic Society*,' published in 1887, contains several papers of much interest. Professor R. G. Bhandarkar contributes his 'Wilson Lectures' on "the Prákrits and the Apabhraṃśa," as well as a report of his visit to the Vienna Congress. There is also a paper by Professor Peterson "on a new Sanskrit Anthology, the *Suktimuktávali*, of Jalhana."

The *Madras Journal of Literature and Science*, in addition to papers on coins and antiquities &c., which will be found under separate heads, contains a paper by Mr. E. Stradiot "on the Principles of Hindu Music."

A recently established Journal, which deserves notice, is the *Orientalist*, edited in Ceylon by Mr. William Goonetilleke. It is mainly devoted to the discussion of subjects more or less closely connected with Ceylon. The current volume is the IIIrd, of which we have received eight parts. The editor and Rev. Chas. Carter give us papers on the vexed question of "Transliteration"; M. H. A. Piercis, D. A. Jagawardana, G. Weerakoon, and H. White contribute stories of "Singhalese Folklore," and the latter also gives an account of "Singhalese measures of time." There are also papers, by W. Varasinha Tissanayaka on "the philology of the Singhalese language"; by Mr. F. H. de Vos, a "translation of Wybrandt van Waerwijek's voyage to the East Indies;" and of "the Deed of gift of the Island of Ceylon to the Portuguese;" by Mr. C. W. Mudaliyár, on "extracts from the Mahavaṃsa," and by Mr. T. B. P. Ratemahatmiya, "Translations of the Jatakas." Mr. Britts continues his "Curiosities of Tamil Literature," and some of his remarks are criticised by Mr. P. Coomara Swamy in a paper on "the Tamil Language and Literature." In addition there are numerous notes and queries, Sanskrit puzzles and book-notices.

Another useful periodical, *the Indian Notes and Queries*, I regret to say, has ceased to exist.

*Foreign Oriental Societies and Journals. The Journal of the China Branch of the Asiatic Society* contains an account of "the Chinese Oriental College" by F. Hirth. The college was established in 1407, in the 5th year of Gunglo, and one of its principal duties was to train

interpreters for the Chinese Foreign office. The languages originally taught were eight: Tartaric, Judhih, Tibetan, Sanskrit, Arabo-Persian, Pa-yi, Uigurian and Burmese; but others, like Siamese, Japanese, &c. were added in the course of time. Mr. W. M. Becher gives "notes on the Mineral Resources of Eastern Shantang," and Ludovico Nocentini a very useful compilation of the "names of the sovereigns of the old Corean States and a Chronological Table of the present dynasty."

The Journal of the Batavian Society of Arts and Sciences (*Tijdschrift voor Indische Taal-, Land- en Volken-kunde*) contains an account of the origin of the Achinese people and their condition under the former Sulṭáns of Achin. Dr. J. Brandes communicates a Jayapattra dated S'aka 849, and three copperplates from the time of Mataram found in the residency of Krawang.

In the *Journal of the Royal Asiatic Society* Mr. Simpson gives us "some suggestions of origin in Indian architecture." From Mr. E. E. Oliver we have a historical paper on "the Chagatái Mughals," the coins of whom he describes in another paper shortly to be published in our own Journal. Mr. J. F. Hewitt has some interesting "notes on the early history of Northern India," and Mr. R. Sewell some "further notes on early Buddhist symbolism." Mr. John Capper describes "the Dágabas of Anurádhapura, and Major-General Sir F. J. Goldsmid contributes an appreciative review of Professor Sachau's "Albiruni." The other papers are by Professor A. H. Sayce, on "the Cuneiform Inscriptions of Van;" by Mr. R. N. Cust, on "the languages spoken in the Zarafshan valley, in Russian Turkistan," and by Mr. M. V. Portman, "on Andamanese Music."

I cannot but regret that we have not received any numbers of the *Journal of the American Oriental Society*, as it usually contains papers of considerable interest to us in India.

The Journal of the Asiatic Society of France *(Journal Asiatique)* brings us again one of Mr. Senart's valuable contributions on "Indian Epigraphy," in which he discusses the fresh information derivable from the newly discovered XIIth edict of Aśoka at "Mansera," now published by Prof. Bühler in the *Epigraphia Indica*. Of equal interest is Mr. Abel Bergaigne's account of "the Ancient Kingdom of Champá," linguistic, historic, geographical, religious, &c., as it may be gathered from its inscriptions. Mr. Leon Feer continues his "Buddhistic Studies," in which he gives us translations of the legendary and narrative portions of the commentary on the Upálí Sutta.

The Journal of the German Oriental Society (*Zeitschrift der Deutschen Morgenländischen Gesellschaft*) as usual, contains a very large number of contributions of which I will here only mention those that are of

special interest to us in India. Professor O. Böhtlingk gives us two small but useful notes on "the impersonal use of the participle future passive in Sanscrit," and on "the Grammar of Kátantra." Mr. E. Wilhelm has contributions to the "Lexicography of the Avestá," and D. H. von Wlislocki, to "Benfey's Panchatantra." To Professor Oldenberg we are again indebted for two valuable papers on "the Song-writers" and "the Adhyáya division of the Rigveda." I would call particular attention to the proposals addressed by Professor E. Leumann "to all future editors of Indian dramas and non-vedic prose texts" with reference to the adoption of an uniform system of editing with the object of facilitating, especially for the purpose of Dictionaries, an easy and intelligible system of citation of words or passages from the edited texts.

The *Vienna Oriental Journal* is keeping up its high character, and gives us a great variety of most interesting matter. I may instance Professor Kielhorn's paper on "Hemachandra's Sanskrit Grammar," Mr. Manilal N. Drivedí's on "the Advaita philosophy of Śankara," Prof. H. Jacobi's "on Rudraṭa and Rudrabhaṭṭa" and "on Viśákhadatta," and Dr. Jos. Zubaty's on "the change of quantity in the terminations of Vedic words." Dr. Hanusz continues his "Contributions to Armenian Dialectology," and Prof. Bühler adduces "further proofs of the authenticity of the Jaina tradition." Mr. Joh. Kirste again discusses the vexed question of the meaning of the words *raonano rao* on the Indo-Scythian coins, to which he proposes to assign a Semitic origin from a root meaning "to guard as a shepherd."

*Indo-Aryan.*—On the subject of the Indo-Aryan languages generally, I have to notice the translation of the first volume of Professor H. Brugmann's "Elements of the Comparative Grammar of the Indo-European languages," prepared by Mr. J. Wright. It contains the introduction and phonology.

*Sanskrit.*—This is a vast subject, and I must limit myself to drawing your attention to some of the more prominent publications in Europe and India. For fuller information, I cannot do better than refer you to the annual lists of serial publications, such as our own *Bibliotheca Indica*, the *Benares Sanskrit Series*, the *Bombay Sanskrit Series*, the *Sacred Books of the East*, *Orientalische Bibliographie*, and others. Mahámahopádhyáya Ch. K. Tarkálankára has published an edition of the *Kusumánjalí*, a standard work of the Nyáya philosophy, with the explanation *(vyákhyána)* of Haridása Bhaṭṭáchárya, to which he has added a very full commentary *(ṭíká)* of his own. Dr. Winternitz has given an excellent edition of the *Ápastámbíya Gṛihya Sútra*," with extracts from the commentaries of Haradatta and Sadarśanárya; Professor Jolly, of the *Mánava Dharmaśástra*, and Professor P. Peterson of the

*S'árngadhara Paddhati*, the two latter in Trübner's *Oriental Series* and the *Bombay Sanskrit Series* respectively. To Professor Paul Deussen we are indebted for a translation (in German) of the *Vedánta Sútras*, or the *S'áviraka-Mímáṃsá*, of Bádaráyaṇa, with the complete commentary of S'ankara, and to Professor Böhtlingk for a translation (also in German) of "Páṇini's Grammar," together with the text and explanations. Professor A. Weber has contributed the edition of a very curious little book, called the "*Párasí-prakáśa*." It is a Persian-Sanskrit vocabulary, written in Sanskrit by Vishṇudatta, during the reign of the emperor Akbar. To Professor Delbrück we are indebted for a "Syntax of the Ancient Indian Language" (*Altindische Syntax*). Your attention may be specially drawn to the new great work of Professor Oldenberg on the "Hymns of the Ṛigveda," of which the first volume has been issued. The author makes an attempt in this work to restore the text of the Ṛigveda from its traditional to its original shape, as far as Vedic tradition and the present state of philosophical inquiry allow. The first volume explains the Vedic metres, discusses the principles of arrangement, and traces the history of the Vedic text. In subsequent volumes the text itself will be published, with a full 'apparatus criticus.' I need not do more than recall to your memory the Sanskrit Dictionaries of Böhtlingk and Cappeller, the re-edition of the *S'abda-Kalpa-Druma* by the two brothers Baradá Prasáda and Hari Charana Basu; Pratáp Ch. Ray's English Translation of the *Mahábhárata*, and Parab and Durgá Prasád's *Kavyamálá* (a monthly magazine), the publication of all of which is making satisfactory progress. But I must not omit to notice Professor J. Eggeling's "Catalogue of Sanskrit MSS. in the library of the India Office," of which Part I, containing the Vedic MSS., has been issued; and the new edition of Professor Sir Monier Williams' "Sanskrit Dictionary."

*Páli.*—The most important publications of Páli literature are those of the Páli Text Society. In their Journal have appeared the "*Símá-viváda-vinichhayá-kathá*," edited by Prof. J. P. Minayeff; the "*Saddhammopáyana*," edited with notes by Dr. Morris, and the "*Pajjamadhu*, a poem in praise of Buddha," edited by Mr. G. R. Gooneratne (Modaliyar) Their annual volume has given us the text of the first volume of the "*Majjhima Nikáya*," edited by Mr. V. Trenckner. To this I may add the translation, by Mr. L. W. Modliyar, of that portion of the *Mahávaṃsa* which remained untranslated by the Hon'ble G. Turnour, and which is now in course of publication.

*Prákrit.*—Of publications of works in the ordinary Prákrit, I have to note Vákpati's historical poem, called the *Gaüdaváho*, which has been edited by Mr. Sh. P. Pandit, in the *Bombay Sanskrit Series*, and to which

he has added an elaborate introduction, discussing the historical questions connected with king Yaśovarman of Kanauj whose exploits are related in the poem. With regard to the Jaina Prákrit, Dr. A. F. Rudolf Hoernle's edition of the *Uvásagadasáo* in our own *Bibliotheca Indica* deserves attention as being the first complete edition of a Jain work, furnishing in full the Prákrit Text, Sanskrit commentary, and English translation with explanatory notes. The work is the seventh of the earliest sacred books (or *Ágamas*) of the Jainas, and sets forth the rules of conduct incumbent on a Jain layman. A most valuable contribution to the study of Jainism is Professor A. Weber's "Catalogue of Jain MSS. in the Royal Library of Berlin."

*Zend and Pahlaví.*—With reference to Zend your attention may be drawn to Dr. Karl F. Geldner's standard edition of the "*Avesta*, the Sacred Books of the Parsis," the publication of which is making satisfactory progress. I may also note Mr. H. D. J. Jamasp-Asána and Mr. E. W. West's joint edition of the Pazand Sanskrit Text together with a fragment of the Pahlaví, (in the *Bombay Sanskrit Series*), to which the editors have added a comparative vocabulary and introduction.

*Arabic.*—The most noteworthy publication in Arabic literature is Professor E. Sachau's English Translation, with notes and indices, of Alberuni's 'India,' the Arabic text of which has been published a year before. The same scholar, in his *Indo-Arabische Studien*, makes an interesting contribution to the elucidation of the pronunciation and history of the Indian Vernaculars in the earlier half of the eleventh century as evidenced in Albiruni's 'India.' W. E. Gasselin's French-Arabic Dictionary, is making satisfactory progress. I may also note W. C. Salemann's edition of the Míyar-i-Jamálí, a full account of which the editor has given in Vol. XXXII of the *Bulletin of the Imperial Academy of Sciences of St. Petersburg*. The issue of the first volume of the second edition of the Catalogue of Arabic MSS. in the Library of the Leyden Academy, by M. J. de Goeje and M. Th. Houtsma, is also deserving of notice.

*Modern Indian Literature.*—The progress made in Modern Indian Literature in general may be best seen from the 'Catalogues of Books printed in British India,' which are published quarterly in every Province under the provisions of Act XXV of 1867. It is a very large and interesting subject, but I can only briefly refer to it in this place, and so far as the catalogues have been available. In general, it may be said that there is a kind of family likeness observable in the lists of Vernacular and English works published in the various provinces. The majority of the writers are Hindús, brought up under very similar circumstances and influences. In Bengal, the North-West, the Panjáb, Bombay and Madras, the provinces which have any considerable literature, they are inspired by the

same high regard for the Hindú Shástras, the same desire for bringing about a revival of Hinduism, the same admiration for the science of Hindú Medicine, the same aversion to the Anglicising tendency of the past generation, combined with the same admiration for the great writers and thinkers of Europe, and the same loyalty to the British rule and Empress. It is curious to note that literary effort in India occupies itself more with religion than with any other subject. Though there is a family likeness between the several lists, yet each provincial list exhibits also a peculiar characteristic. Bengal has a literature rich in biography and fiction; the Panjáb is noticeable for its controversial writings of the professors of the Hindú, Arya, Sikh, Muhammadan and Christian religions; Madras excels in the number of books published for the glorification of the deities of particular shrines; Bombay is distinguished by Jain and Parsi publications. Even in Muhammadan literature we mark the same family likeness in the several lists, in the matter of a preponderance of Persian fiction. Urdú in its various forms is the Muhammadan vernacular throughout the several provinces, from the pure and elegant Urdú of the Doáb and Oudh to its variously modified phases in Bihár, Bengal, Gujarát and Panjáb: and I may remark here, in passing, that the Bengálí Urdú even possesses peculiar and hitherto almost unnoticed alphabetical characters of its own. The backward condition of the Muhammadan community is plainly observable in the paucity of their English-written books.

*Bengal, including Bihár, Orissa and Assam.*—In Bengal we notice 2,351 entries in the official catalogue, from the middle of 1887 to the middle of 1888. Of the entries about 80 per cent. are Bengali, and 35 per cent. are works designed for educational purposes. Publications in English are becoming more and more numerous, and more and more important. During the period under review two excellent biographies in English were published by two native gentlemen. One is the "Life of Rai Kristo Das Pal" by Mr. N. N. Ghose. The other is Bábú P. C. Mozumdar's "Life and Teachings of Keshub Chunder Sen." Dr. Shambu Chandra Mukherji's "Travels and Voyages between Calcutta and Independent Tippara" gives a faithful picture of Hill or Independent Tippara, and shows to young Bengalis, fond of travelling to Europe, that there are many interesting things nearer at home which should engage their attention before they think of undertaking a journey beyond the seas. Ram Chander Bose's work on "Hindu Heterodoxy" contains a review of Buddhism, Jainism and other systems of religion not considered orthodox by the people of India. The number of works of fiction issued from the Bengal presses is very large; it will suffice to draw your attention to two of the most striking. The "Bishad

Sindhu" is written by a Muhammadan, Mír Musharraf Husain, in standard Bengalí,—a form of Bengalí which Musalman writers but rarely employ, their works being generally written in what is called Musalmání Bengalí, written from the right to the left, and containing a large admixture of Persian words, phrases and idioms. It is a sort of historical novel, introducing the principal events from the death of Muḥammad to the release of Zainu-l-'Abidín. The other novel that I may note is the "Abalábalá," by Satya Charan Mitra; it tells the story of a Hindú wife engaged in the search of her lost husband. The republication of the works of the followers of Chaitanya, by Ráma Náráyaṇa Vidyaratna, and of Hindú philosophical works by Mahesha Chandra Pála, which were noticed in the last Annual Address, is making satisfactory progress. The progress of two other serial works, the "Bárat Kosh," or "Indian Encyclopædia," by Ráj Krishna Ráy and Sarat Chandra Deb, and the "Biswa Kosh," or "Universal Encyclopædia," by Rangalal Mukharji and P. N. Mukharji, also deserves mention. An edition of the Sámaveda Saṃhitá, with a Bengalí translation, by Pandit Satyavrata Samáśramí, shows the growing popular interest in the most ancient literature of India. The Uriya and Assamese works entered in the Bengal catalogue are mostly either works designed for educational purposes, or works in connection with local forms of Krishṇa myths. Of Hindú works published in Bihár, I would draw your attention to the publication of the collected works of the celebrated modern Hindí poet Harischandra, by Rám Dín Singh. It is printed in the Kaḍga Vilás Press in serial parts. The same editor is also now publishing a very careful edition of the famous Tulsí Rámáyan from old MSS. in the possession of Mr. G. A. Grierson. Ray Káshí Parshád is publishing an excellent edition of the same text with a very fine commentary. It will take some years before this great work is finished.

*North-Western Provinces and Oudh.*—I regret that I have only been able to obtain the official catalogue of the second quarter of 1888. In it there are 5 publications in English, 135 in Urdu, 52 in Hindí, 4 in Sanskrit, 9 in Arabic, 23 in Persian, 64 polyglot, and 18 periodicals. The average number of publications in the united Provinces is about 1,000. Of original works in Hindí the following deserve notice: the "Bichitropades" an anthology of humorously didactic verses, collected from the works of numerous mediæval and modern poets, by Pandit Nak'chhedí Tiwárí; the "Sangít Málá," a collection of folk-songs in the popular dialects, by Lála Kántá Parsád; the "Badmásh Darpan," of Teg Alí, which describes the habits and customs of the rabble of Benares city in their own Bhojpúrí dialect; and the "Merí Janma-bhúmi játrá" by Pandit Damodra Śástrí. Specially meritorious work is being done in the edit-

ing of old and new standard works. Two editions of the Tulsí Dás Rámáyan I have already noted under Bengal. To these I may add an edition of Chand's great Epic, the "Prithiráj Rásau," which is being published in serial parts by Pandit Mohanlal Vishnulal Pandia; the "Nakh Sikh," written A. D. 1637 by Sayad Gulám Nabí, *alias* Ras Lín, and edited by Pandit Nak'chhedí Tíwárí; and the "Sringár Sangrah," written by the poet Sardár of Banáras, and edited by the well-known Munshi Newal Kishore of Lakhnau. Of original works in Urdú may be noted a "History of Oudh" (Tawáríkh Aína-i-Awadh) from the earliest times, by Sháh Abul-Hasan Pírzáda; and a life of the late king of Oudh, Wajid Ali Sháh, (Tawáríkh Sháh-i-Awadh) by Syud Muhamed Sajjad Husain: of translations into Urdú, a version of the "Táríkh-i-Ferishta," and of Sir Mackenzie Wallace's work on "Egypt."

*Panjáb.*—The number of publications registered in the Panjáb Catalogue is nearly 1800; but the majority of them are of an ephemeral character. Of medical works may be mentioned the "Madhusúdní Nighaṇṭu," a glossary of medical terms in English, Arabic, Persian, Hindí and Sanskrit. Religious controversial works are specially numerous, those of the Sikhs and Aryas being particularly interesting. There are also numerous works in praise of Muhammadan saints, written in Urdú. Publications in the latter language are the most common, though there are also many in Panjábí and Hindí, and some in Sindhí, Pushtú, Persian, Arabic and English.

*Madras.*—The Madras publications average about 250 per quarter, and are written in English, Tamil, Telugu, Malayalim, Kanarese, Tulu, Hindí, Sanskrit and Persian. A Tamil-French Vocabulary has been published by Mr. M. A. Lap. Besides works designed for educational purposes, there are a large number of works written either in defence of the "advaita" or non-dual system of philosophy, or in praise of Śiva or Vishṇu of particular shrines. Madras being the home of Śankara Áchárya and his 'advaita' philosophy, that system has still a stronger hold there on popular belief than in any other province.

*Bombay.*—The average number of publications in Bombay is about 1,900 a year. Maráṭhí and Gujarátí are the languages in which the largest number of works are published; but Urdú, Hindí, Sindhí, English, Sanskrit, Zend, Hebrew also contribute their quota. Besides literary works and works designed for educational purposes, such as Mangal Das Prabudá's "English-Gujarátí Dictionary," Bombay publishes the largest number of works on the Jaina and Zoroastrian religions. "Parsiism, its place in history," in English, by Professor J. Darmesteter, is a learned exposition of Zoroastrianism, giving it a high place among the religions of the world. Kabasji Edalji Kanga has published

a Gujarátí transliteration and translation of the Zend-avesta. I may also note some Maráṭhí translations of Sanskrit works: the Bṛihat Kathá Ságara, a free translation of Somadeva's Kathá Sarit Ságara; the Gítá Subodha Chandriká, a translation of the Bhagavadgítá (with the text); the Dharmasindhu, a translation of Káśínátha's Dharmasindhu. The "Jain Vṛitta Sikshápatra," by Svámi Ládháji Deoji, in Gujarátí, is designed as a book of instruction in Jainism. More important are two books by Muni Átmárámji Vijay Ánandjí, both in Hindí, the "Ajñána-timira-bháskara," a controversial book and the "Jainádarsha," an exposition of Jainism. I may also draw your attention to the edition of a few chapters of the "Dnyaneshvarí," a commentary on the Bhagavadgítá, which is published in a work entitled "Nabaníta" (or butter), a collection of Maráṭhí poems. The Dnyaneshvarí is regarded as the oldest Maráṭhí work in existence, and its language is so different from the modern Maráṭhí that it cannot be understood without a commentary.

*Indian Border-lands.*—I will now pass on to a brief review of the literature of the Border-lands of India. The "Manual of *Sikkim* and *Bhután* languages," by the Rev. G. Sandberg, will prove a very useful help to many of us; and the same may be said of the "Grammar of *Lhotá Nága*," by Rev. W. E. Witter; of the "*Bengali-Garo* Dictionary," published by the Calcutta Missionaries, and of the Rámáyan by Bhánu Bhaktáchárya, in *Nepálí*. To *Kashmírí* students may be recommended Rev. W. Wade's "Grammar of the Kashmírí language," with texts, and Rev. J. Hinton Knowles' "Folktales of Kashmír:" and to those who interest themselves in *Andamanese*, a "Manual" of that language, by Mr. M. V. Portman. Perhaps I may best mention here *Gipsy*, which is an Indian dialect spoken in Europe, as shown by its very name "Romani Çib" (Ḍomaní Jíbh). A grammar, vocabulary and chrestomathy of it has been published by W. J. Ješina; and I may also note the "English Gipsy Index," by Mrs. Grierson (originally in the *Indian Antiquary*), of which a separate edition has been issued. Of *Singhalese*, we have a "Grammar," by the Rev. C. Chounawel; of *Burmese* a "Manual," by Captain Chas. Slack, and a "Pocket Dictionary, with an abridgment of Dr. Judson's Grammar," by M. M. Phinney and Ebeleth. Of the *Shan* language, there is a "Grammar," by Mr. J. N. Cushing; and of *Malayan* a "Grammar," by Mr. J. Pijnappel, and "a Complete Course, in the form of letters, to teach the Malayan language," by Mr. A. A. Rockoff, both in Dutch, also an "English, Salu and Malay Vocabulary," by Mr. T. H. Haynes.

*Tibetan.*—A translation of the *Bses-pai-phrin-yig* or "the Friendly Epistle" has been published in the Journal of the Páli Text Society. But the most important contributions to the publication of Tibetan

Literature have been made in our own *Bibliotheca Indica*. Of the *Shes-rab-kyi-pha-rol-tu-phyin-pa* (commonly called Sher-chin) or the *Śatasáhasrika Prajñapáramitá*, Bábú Pratápachandra Ghosa has now published a second fasciculus; and of the *Rtogs-brjod-dpag-bsam-khri-śiṅ* (or shortly Pag-sam-khri-śiṅ) or the *Avadánakalpalatá*, edited by Bábú Saratchandra Dás, the first fasciculus has just been issued. An especially important feature in the latter edition is that it gives side by side the original Sanskrit text of the work and its Tibetan translation. It is much to be regretted that we have not been able to follow the same plan in the case of another important Buddhist work, the *Nyáyabindu Ṭíká*, of Dharmottara Áchárya. A manuscript of this work was discovered, some time ago, by Professor Peterson in the temple of Sántináth, in Cambay.* His offer to edit it for the Society was gladly accepted; and it was at first intended to publish the text of the Tibetan translation by the side of the Sanskrit original. But failing to obtain a copy of the translation, it was resolved no longer to defer the publication of the Sanskrit original. It is now in the press, and it is hoped that the first fasciculus will appear before long. Quite recently Professor Peterson has succeeded in obtaining a copy of the text, as well as another copy of the ṭíká, so that there will be no difficulty in ensuring a good text. Perhaps I may best notice in this connection two other Buddhist Sanskrit works. One is the *Svayambhu Puráṇa* which is being prepared for publication in the *Bibliotheca Indica* by Pandit Hara Prasáda Śástrí, from MSS. in the Society's and the Cambridge University's Libraries. The other is the "*Ashṭasáhasrika Prajñapáramitá*," the edition of which has now been completed by Rájá Rájendralála Mitra.

### Numismatics.

A very large number of coins, amounting to upwards of four thousand specimens, have during the year been examined and reported on by Dr. Hoernle, our Philological Secretary. Most of the coins found in Northern India are, under the provisions of the Treasure Trove Act (VI of 1878), forwarded to the Society for examination and distribution to the principal Museums of India; and the detailed reports on them are regularly published in the *Proceedings* of the Society. The total number of coins thus reported on was 2,460. They belonged to coin-troves found at various dates in Jabalpur, Sháhpur (Panjáb), Sialkoṭ, Sarun (Bihár), Rohtak, Rawal Pindí, Bijnour (N.-W. Prov.), Wardha (Cent. Prov.), Hoshangábád. Among them were 456 gold, 786 silver, 83 mixed silver and gold, 1,130 mixed silver and copper, and 5

* Journ. Bo. B. R. A. S., Vol. XVIII, No. XLV, (Extra Number) p. 33.

copper coins. Of the gold coins, 451 are of various Paṭhán emperors of Delhi, and 1 of the Bengal king Sikandar Sháh. Of the 786 silver coins, 1 belongs to Ranjít Singh, 1 to Nádir Sháh, and the remainder to various Mughal emperors of Delhi. Among the 83 coins of mixed silver and gold, 62 are later Indo-Scythians of the *Kida* type, and 25 are Mughal forgeries. Among the 1,130 coins of mixed silver and copper, there are 37 so-called punch-coins, 877 belong to different Paṭhan emperors of Delhi or their cotemporaries, 159 to different early Rájpút Rájás and 57 to Yaśovarman. The 5 copper coins are all early Indo-Scythians or Bactrians. Detailed notices of all these have been given in the special reports, printed in our *Proceedings*. Most of the coins belong to well-known and often described and published types. There are, however, among them a few of special interest. In a hoard of 477 coins discovered in Hoshangábád, there were found no less than five unique Paṭhán gold mohurs, descriptions of which will be published by Dr. Hoernle in our *Journal*. One of them is a new coin of Muḥammad bin Tughlaq; two belong to Ghiyáṣu-d-dín Tughlaq II.; one to Abú Bakar, the son of Ẓafar Khán, and one to the Bengal Sulṭán Sikandar bin Ilyás. I may also note the coins of Yaśovarman and of Saifu-d-din Hasan Qurlagh, in the August and November *Proceedings*, which offer improved readings of their legends. The Society's share of these coins, distributed under the Treasure Trove Act, was 89, the details of which are given in the Annual Report.

Another large quantity of coins, collected by Bábú P. C. Mukherji, on special duty with the Archæological Survey, and sent by him to the Imperial Museum in Calcutta, has also been examined and identified by Dr. Hoernle. It comprised 506 specimens which belonged to 20 different classes. Among them were 2 Roman brass coins (1 of Gallienus); 2 silver Byzantines; 8 copper Bactrians; 27 early and 11 later copper Indo-Scythians; 12 silver Guptas; 3 silver Surashtrians; 3 silver punch-coins; 1 copper Yaudheya; 126 old Hindú coins of a large variety of types (including 32 Mitras and 72 so-called Buddhist Satraps); 7 silver Sassanians and 4 silver Indo-Sassanians; 8 gold Raṭhors and Chandels; 2 copper Kashmír (Toramaṇa); 5 copper early Rájpúts (3 Bull and Horseman); 6 copper Paṭháns; 1 copper Kángrá; 1 copper square Málwa (Ghiyáṣu-d-dín bin Maḥmúd), and 4 modern copper and nickel (Turkish) coins. A more detailed report is being prepared by Dr. Hoernle for publication in our *Journal;* but I may note that there are among them a few curious coins, *e. g.*, 2 Bactrian coins of impure silver with a quadriga and the legend LAECA on the reverse; a Hverki copper coin of the NANA type, which appears to be an ancient forgery of the corresponding gold coins, though the specimen shows no trace

of gilding or silvering, and 3 copper coins with two female and one male figures on the reverse, resembling certain Gupta types.

Besides these a very large number of coins, upwards of a thousand, have passed through Dr. Hoernle's hands, sent to him by private collectors for identification. Among them there were some of very special interest. Your attention may be drawn to a new Bactrian coin, a variety of a silver hemidrachm of Strato I., which offers a new legend with *dhramikasa*, instead of *prachachhasa*, and was purchased for the Society's collection from Mr. J. G. Delmerick; also to a new gold Gupta coin, a unique variety of the "king and queen" type of Chandra Gupta I., which was forwarded by Mr. H. S. Boys. Both are noticed in the April *Proceedings* of the Society. Another unique gold coin, belonging to the Bengal Sulṭán Jalálu-d-dín Fatḥ Sháh, and dated 890, has lately fallen into Dr. Hoernle's hands and will be published in the Society's *Journal*.

The Lucknow Museum has received a large number of additions; *viz.*, 24 gold, 148 silver, and 879 copper coins. Dr. Führer's report classifies them as follows: "of the gold coins; 10 are of Kumára Gupta Mahendra of six different types, 6 of Chandra Gupta II. of three different types, 4 of Gangeya Deva of Chedi, 1 of the Chandela Víravarma Deva I., 1 of Narapála Deva of Rewa, and 2 of Govinda Chandra Deva of Kanauj. Of the silver coins; 15 are of the earliest Hindú period, 10 of the Indo-Bactrian period, 12 of the Indo-Sassanian period, 6 of the Varáha dynasty, 10 of Vigraha Pála of Magadha, 6 of Muḥammad bin Sáme, 6 of Ghiyáṣu-d-dín Balban, 7 of Muizzu-d-dín Kaiqobád, 1 of 'Aláu-d-dín Muḥammad Sháh I., 8 of Sher Sháh, 11 of Islám Sháh, 5 of Akbar, 1 of Jahángír, 2 of Sháh Jahán, 4 of Aurangzíb, 1 of 'Álam Sháh, 2 of 'A'lamgír II., 7 of Sháh 'A'lam Jalálu-d-dín, and 26 British and Indian war medals. The copper coins comprise 257 Buddhist (inscribed), 41 of the Mitra dynasty, 306 Indo-Bactrian, 72 Indo-Scythian, 1 of Gangeya Deva of Chedi, 199 Musalmán, 2 Burmese, and 1 Nepalese." The Coin Catalogue of the Museum is in the press.

The coin collections of the Madras Museum received large additions during the year, including a gold coin of Táju-d-dín Yildiz; coins of the Greek and Scythic kings of Bactria and India, Lysias, Rajnabala, Spalirises and Azes, Abdagases, Orthagnes, Zeonises, Kadphises I., and Kadaphes, the bronze coin of the last king having on the obverse a head of the king diademed, and closely resembling the head of Augustus on some of the coins of that Emperor; several new types of Mysore coins, and a collection of copper coins found at Kilakarai on the Madura Coast, where there are remains of a large city, said to have extended from Kilakarai to Muthupettah, about 9 miles, and also to Sheramoodelly

Theeoo, an island about 5 miles south. Illustrated Catalogues (Nos. 1 and 2) of the coins of Mysore and of the Roman, Indo-Portuguese, and Ceylon coins, contained in the Museum collections were issued, and Mr. Thurston was engaged upon a history of the Coinage of the East India Company, from the first issue of coins, the portcullis money of Queen Elizabeth in 1601, to the passing of Act No. XIII of 1862. A great deal of interesting information on this subject was found in going through the records of the Madras Mint.

The Journals of the different Asiatic and Numismatic Societies have brought us some very interesting papers. Our own *Journal* has two papers, by Mr. Chas. J. Rodgers, on the "Couplets or *baits* on the coins of Sháh Núru-d-dín Jahángír" and "on Coins after the time of Jahángír," and another paper by Mr. E. E. Oliver, "on the Coins of the Chagatái Mughals" will shortly be published. The *Madras Journal of Literature and Science* contains a paper by the Rev. James E. Tracy "on Pandyan Coins," and a continuation of Captain R. H. C. Tufnell's useful "Hints to Coin-collectors in Southern India." In the *Journal of the Bombay Branch of the Royal Asiatic Society*, Mr. O. Codrington contributes a paper "on coins of Kachh and Kathiawar;" and a very important paper by Dr. Gerson da Cunha, on the "gold coins of the Mongol dynasty of Persia," will shortly be published in it. The gold coins of the Persian Mongols are very rare. Hitherto only 20 specimens have been catalogued and published. Dr. da Cunha now promises to publish 40 new coins from his own cabinet. The *Numismatic Chronicle* of England continues to hold its high place. Among its many valuable articles, I will only draw your attention to two which are of special interest to students of Indian coins. One is a paper by Professor Percy Gardner on some "New Greek coins of Bactria and India," which describes a curious decadrachm, supposed to be of Eukratides or Heliokles, and a few new didrachms of Diomedes, Strato, Philoxenos and Hermaios. The other is a paper by Major-General Sir A. Cunningham on "coins of the Indo-Scythian king Maüs or Heraüs," in which he shows that this person was not a king of the S'akas but of the Kusháns. I have also to note another of Mr. Stanley Lane-Poole's welcome coin catalogues. This is the "catalogue of the Muhammadan coins preserved in the Bodleian Library at Oxford," enumerating a total of 951 coins of Muhammadan dynasties in Europe, Asia and Africa.

### Archæology and Epigraphy.

The past year has been specially fruitful in Archæological work,—interest in which shows no sign of decline, but, on the contrary, appears to have revived, if we may judge by the appearance of new publications,

the vigour with which the operations of the Archæological Surveys have been conducted all over India,and the increasing care and attention given to the preservation of the monuments of the past by local Governments.

*Publications.* The *Indian Antiquary* continues, as hitherto, *facile princeps* among Indian Archæological Journals. The year's issue is especially distinguished by the numerous valuable contributions by Mr. J. F. Fleet, Prof. Kielhorn, Pandit Sh. B. Dikshit, on various difficult or still unsolved problems connected with the calculation of Hindu dates and eras, such as the Twelve-year cycle of Jupiter, and the Gupta, Śaka, Kalachuri and Newar eras. I may specially notice Prof. Jacobi's elaborate paper on methods and tables for verifying Hindu dates, tithis, eclipses, nakshatras etc. which occupies the whole of the June issue, and will be welcomed by all who may have occasion to verify the dates of ancient documents. Mr. Fleet and Professors Bühler and Kielhorn, also, give us a continuation of their readings of Sanskrit Inscriptions; and Mr. H. H. Howorth of his history of "Chingis Khán and his ancestors." Dr. A. F. Rudolf Hoernle gives "an account of the Bakhshálí Manuscript, with extracts and translations" from it; and Mr. E. Rehatsek of the "*Ẓafarnámah-i-Ranjít Singh*, of Kanhayya Lál." Capt. J. S. King contributes a paper on "the Story of the murder of Ali 'Adil Sháh I. of Bijapur." The Rev. T. Foulkes gives an account of the "Vicissitudes of the Buddhist literature of Ceylon," and Dr. Edkins of "Confucius and his Mission." In addition we receive instalments of republications and papers published elsewhere by Professor Weber, on "the Literature of translations of the Jains," and by Mr. Senart on "the Inscriptions of Piyadasi."

A new Journal, which promises to become in one respect a formidable rival of the *Indian Antiquary*, is the "*Epigraphia Indica and Record of the Archæological Survey.*" It is edited by Dr. Jas. Burgess, C. I. E., the indefatigable Director of the Archæological Survey of India, with the assistance of Professors Bühler and Kielhorn, Dr. Hultzsch and other linguistic scholars, whose names are a guarantee for the trustworthiness and success of the new serial. It is to be issued in parts of about 56 pages each—four in the year—and will form really a continuation of the "*Corpus Inscriptionum Indicarum*," of which Sir. A. Cunningham issued Vol. I. some years ago, and Vol. III is under preparation by Mr. Fleet.

Part I. has been recently issued, and Part II. is ready for issue. In a short introductory note the Editor states briefly the importance of epigraphical research in its bearing on Indian history and antiquities. The first inscription is a copper-plate grant of the Pallava king Śivaskandavarman of about the 4th century, which is philologically of great importance. The second is a *praśasti* from a

village in the Himalayas, of about the end of the 6th century, which gives the names of twelve kings of Singhapura, a small kingdom in the Panjáb mentioned by Hiuen Tsiang. The next by the same editor, Dr. Bühler of Vienna, is a careful transcript and translation of the recently discovered twelfth Edict of Aśoka at Sháhbázgaṛhí. This discovery happened thus:—In 1887, Dr. Burgess visited Yusafzai and Hazara and took impressions of the great inscriptions in Baktrian Páli of the Aśoka edicts. When at Sháhbázgaṛhí he looked carefully, in company with Captain H. A. Deane, the Assistant Commissioner, for the missing twelfth edict, making enquiry of the cattleherds for any inscribed stones. Later in the year a heavy fall of rain washed the earth from a stone, the mere crest of which was previously above the surface, and laid bare a portion of the inscription. Captain Deane, on noticing this, had the face of the stone laid bare and transmitted impressions to Dr. Burgess, who had them photographed. M. E. Senart saw the impression when visiting Dr. Burgess at Mathurá, in January 1888, and was so interested in the discovery that, having previously edited the Aśoka inscriptions so far as accessible, he arranged to visit Sháhbázgaṛhí personally, and has given a second version of this edict, which was first read to the Bombay Asiatic Society, and since to the Société Asiatique, with emendations and comments and an edition of the Mánserá version, which has just been issued separately as "*Notes d'E'pigraphie Indienne.*" The fourth inscription in this publication is a long but sadly mutilated *praśasti* from Dabhoi in Gujarát. Then follow three long inscriptions from the Central Provinces, the stones being now in the Nagpur Museum, edited by Professor Keilhorn from Dr. Burgess' impressions. The part closes with a Ráshṭrakúṭa grant of Krishṇa II., dated Śaka 832, by Dr. E. Hultzsch.

Part II, will contain a copperplate grant of Śrí Harshavardhana, and other papers of interest; and a series of Arabic and Persian inscriptions will appear shortly. The great inscription mentioned by Dr. Fitz Edward Hall (J. A. S. B., Vol. XXXI, pp. 6, 7), so long desiderated, has been found by Dr. Burgess at Síḍoṇí Khurd, in the Lalitpur District. It has been translated by Dr. Kielhorn, and will be published in the new journal. The work will thus be valuable for the historian as a standard work of reference.

The volume on the Antiquities of Dabhoi (*anc.* Darbhavatí), announced last year, has been carried through the press by Dr. Burgess, for H. H. the Mahárája of Baroda. It is beautifully illustrated with numerous photolithographs and photocollotypes, from the very careful drawings by Mr. Cousens and his staff, and is produced in a style that does credit to the liberality of an enlightened native prince. A much

larger volume on the antiquities of Anhilwáḍa, Siddhpur, and other places in His Highness' dominions is in an advanced state of preparation.

*Archæological Surveys.*—During the year vigorous progress has been made in the Archæological Surveys in various parts of India, and in the publication of the work of previous years. I am indebted to Dr. Burgess, C. I. E., the Director General, and his assistants for very interesting accounts of their labours, from which I can only give brief extracts.

Dr. Burgess recently made a tour in Yusufzai and has made a geographical identification of some interest, *viz.*, that Tárilí, in the hills to the N. W. of Sháhbázgaṛhí, is the ancient *Ḍhalila*, the capital of Udyána.

*Inscriptions.*—During the camping season 1887-88, Dr. E. Hultzsch copied 124 inscriptions at Salem, Trichinopoly, Tanjore and Chodambaram. Among these, the large and numerous inscriptions of the Tanjore temple prove most interesting. According to one of them the temple was built by the Chola king Rájarája-deva, and according to two others its enclosure was constructed by the commander of his army. A comparison of the Chellúr grant of the Eastern Chálukya king Víra Choḍa with a number of unpublished Chola inscriptions has enabled Dr. Hultzsch to settle with some probability the date of Rájarája-deva and of his son and successor Rájendra-Chola-deva. The latter was an antagonist of the western Chálukya king Jáyasiṃha III. (about S'aka 940 to 964), and the former seems to have fought with the Western Chálukya Satyáśraya II. (S'aka 919 to about 930). The Tanjore inscriptions contain long lists of the countries conquered by Rájarája-deva and Rájendra-Chola-deva, most of which can still be identified. As the epoch of these two reigns is now fixed within narrow limits, the approximate dates of a number of earlier Chola kings can be determined with the help of the large Leyden grant of Rájarája-deva. Dr. Hultzsch's first volume of South Indian inscriptions, which contains the materials collected in 1886-87, is now in the press. The present season's work was commenced at Chitradurga, where he took impressions of fourteen Kanarese inscriptions. From there he went to Hampí, the old Vijayanagar, where he has done much work; Tirupatí, will next be visited. Dr. Hultzsch has also contributed translations of a Ráshṭrakúṭa and a Valabhi copperplate grant and other papers to the *Epigraphia Indica*.

Mr. O'Dwyer has sent to the Lahore Museum a very interesting inscription from the Salt range. It is of the time of the "Mahárája Toramáṇa Sháh," at the end of the fifth century (in 490—500 A. D.), and records certain endowments to a Buddhist monastery. Coins of Toramáṇa are known, but only one stone inscription—on a Boar at Eran,

in the Central Provinces—has hitherto been discovered. The date on this epigraph is unfortunately so injured that it is doubtful if it can be fully read. Its discovery so far from Eran adds to its importance. The characters are distinctly of the later Gupta type, about A. D. 500.

The last report of the Lucknow Museum contains a list of a considerable number of interesting additions to the Archæological collections, including a number of Inscriptions, several of which have been published in our *Journal*, and the remainder will appear in forthcoming numbers of the *Epigraphia Indica*.

The Kudarkoṭ Inscription of Takshadatta, which was found, in 1875, at Kudarkoṭ, in the Etáwah District, and is now in the Lucknow Museum, has been published by Dr. Führer in Part I. of our *Journal* for 1888.

Dr. A. F. Rudolf Hoernle is preparing for publication "a new copper-plate grant of Govinda Chandra Deva of Kanauj, dated in Samvat 1188." The plate was found in the debris of a fallen high bank of the Jamuná river, close to the inhabited site of the village of Ren, not far from the village and police station of Lalautí in the Fatḥpur District. This new grant exhibits some curious new readings, not occurring in any of the previously found grants of the same king; but it is especially noteworthy on account of its date in Samvat 1188, which is given both in words and figures, and is important because it proves that Govinda Chandra was still reigning in the year 1131 A. D., his latest date, hitherto ascertained, being the year 1128 A. D. (or Samvat 1185). The village to which the grant refers is Dosahalí.

*Archæological Survey, Bengal.*—Mr. J. D. M. Beglar, the Archæological Surveyor, and his assistant, Mr. Garrick, have been employed during the last season at the Adina Masjid at Paṇḍuah and at Rohtasgaṛh. A number of drawings have been made at both places during the last three years.

*Archæological Survey, Western India.*—During the past year the attention of this Survey, under Mr. H. Cousens, has been engaged principally with the old city of Bíjapur and its remains, which lie spread out on the plains of the Dekhan in a series of ruins of palaces, tombs, mosques, serais, tanks, fortifications and gardens, overrun with jungles of prickly pear, and the city itself encompassed by six and a half miles of crumbling walls.

Up to the present 123 sheets of drawings have been made, illustrating the style of architecture practised here, with abundance of details of mouldings, ornaments &c.; 65 photographs have been taken, and 130 facsimile impressions have been made of Persian, Arabic, Devanágarí and Kanarese inscriptions. The bulk of these inscriptions

have since been translated. The work was also carried into the suburbs which extend for miles around the city, and has now been completed. The staff are engaged in Kathiawar.

In addition to the above work, the drawings, made in previous seasons in the Chalukyan districts, illustrating Chalukyan architecture, have been worked up and, with the MS. to accompany them, are ready for publication.

About 10 miles from Bíjapur is an old hunting, or picnic, lodge of the 'Ádil Sháhí kings, with elaborate arrangements for baths and the showering down of water from the roofs. The walls of the principal building have been covered with frescoes, now much decayed, but containing hunting and other scenes very spiritedly drawn. Among the larger figures are some evidently representing Europeans of rank, perhaps Portuguese ambassadors, in the dress of the 16th or early in the 17th century. But for the Survey these would have been destroyed.

Mr. Cousens' progress-reports gave so good an account of the Bíjapur buildings that Government have sanctioned their being expanded into a Handbook descriptive of the place; and it is now ready for issue.

*Archæological Survey, Southern India.*—Mr. Rea, the Archæological Surveyor, began the last season's work by a survey of the rock-cut and structural remains at Bezvaḍa in the Kistna District. The former were found to be without exception Brahmanical in character, with no traces of Buddhism. The structural temples date from the 7th century. The only example anterior to that date is the structural Buddhist chaitya, discovered near Bezvaḍa which dates from about the 3rd century A. D. The rock-cut remains at Undavalle and Mogalrajapuram are also of Hindu origin and date about the same as those at Bezvaḍa. On completing these Mr. Rea proceeded north into the Godávarí District and surveyed the early Buddhist rock-cut remains at Guntupalli, discovering two additional rock-cut viháras. Some excavations were made at one of the group of Buddhist stúpas and some marble sculptures found, but through the obstruction of the local zamindar, who thought the digging was for treasure, the work was postponed till the following season. Some ancient sites at Pedda Vengi and other places in the neighbourhood were examined, and notes made for excavations to be subsequently conducted.

Mr. Rea then proceeded to Chinna Ganjam and at Kollitippa, in the neighbourhood, found the site of a demolished stúpa and unearthed a large inscribed column in white marble. At the neighbouring mounds of Franguladinne two white marble sculptures had been found some years previously. These were supposed to have been removed from Amarávatí or some of the other stúpas in the district. To prove

whether this was so, or whether they had been from a stúpa on the spot, Mr. Rea made a careful examination of the ground and found a large brick stúpa *in situ*. Some preliminary digging was done and a few small marble sculptures found. The principal point of interest, however, was found when a shaft sunk in the centre revealed not a relic casket but a large *swastika* formed of large bricks. In a neighbouring mound a smaller stúpa platform with inner concentric circle and radiating walls, all in the form of a chakra, was found. These may have had some symbolical significance.

At Kanuparti a number of white marble slabs and columns were seen, which had been dug by the villagers from surrounding mounds. Some exploratory digging was done here and a white marble column found.

At Motupalle over 400 coins were found by searching in the mounds which mark the ancient site.

The season's work was concluded at Amarávatí, where some very valuable slabs and other sculptures were unearthed from near the stúpa. The principal are :—A large stúpa slab with carvings so minute as to resemble work in ivory. It shows a stúpa with all accessory details ; another was a rail panel with figure groups on both sides, over 6 feet long. A number of other large panels, all complete, were found. They include over a dozen inscriptions in Páli. Some exploration in the neighbouring Kuchidibba revealed a number of white marble Buddhist sculptures, and some Hindú images cut out of Buddhist piers.

The present season's work is being again devoted to the Kistna and adjoining districts. Some work has been done in Nellore, amongst which is the discovery of some ancient remains at Juvuladinna. Excavations have been conducted at the Bogandanidibba (No. 1 Stúpa) at Pedda Ganjam, discovered last season, and Mr. Rea writes that, though the work had only proceeded for a few days, five large slabs of sculptured white marble had already been found standing erect around the drum of the stúpa. The digging may be expected to reveal other valuable relics. A third stúpa has also just been discovered in the neighbourhood : it is small and its chief interest is that it has the same symbolical swastika in the centre as has the large No. 1 Stúpa. These discoveries are interesting as showing extensive Buddhist remains at a place where they had been unexpected.

Dr. Burgess has informed me that Mr. Rea has quite recently made a great discovery, a veritable Buddhist Chaitya of early date, brick with marble pillars, and used as a Hindu temple, at Chezarla, in the Kistna district.

In a paper on "Some Prehistoric Burial-places in Southern India,"

contributed to our *Journal*, Mr. Rea gives an interesting description of the megalithic remains and earthen sarcophagi found at Pallavaram, in the neighbourhood of Chingleput and Madura and the Palni Hills.

The *Madras Christian College Magazine* contains very complete notices of Mr. Rea's Archæological work in Southern India.

*Archæological Survey, N. W. P.*—During the cold season of 1887-88, whilst Mr. E. W. Smith and the draftsmen were engaged at Jaunpur in making detailed drawings of the Jámi Masjid, Dr. Führer visited the districts of Partábgaṛh, Ráí Barelí, Unáo, Kánhpur, Fatḥpur and Hardoí in search of ancient sites visited by the Chinese Buddhist pilgrims Fa Hian and Hiuen Tsiang. On topographical grounds and from a calculation of distances, he identifies *Tusháran-Bihár*, in the Partábgaṛh district, with *Hayamukha; Jagatpur*, in the Ráí Barelí district, with *O-yu-to;* and *Kankúr* with the *stúpa* and *samghárama* of *Vásubandhu*, which Hiuen Tsiang places at 40 *li* to the north-west of O-yu-to; *Nawal*, near Bángarmáu in the Unáo district, with *Navadevakula;* and *Sanchánkóṭ*, in the same district, with the capital of the *Sháchi*, mentioned by Fa Hian.

A careful search along the banks of the Arind river resulted in the discovery of several old temples illustrating the brick architecture prevalent in the Doáb during the ninth and tenth centuries; *viz.*, at *Báṛi-Bhitarí*, *Parolí*, *Rár*, *Simbhuá*, *Behta-Bedoná*, *Khurdá*, *Kanchlípur*, and *Sarhár-Amanlí*, in the Kánhpur district. The *śikhara* of these temples is of elaborately moulded brick, whilst the cella which it covers is of carved stone, in the same style as the Chandela temples at Khajuráho. These temples, besides those at *Bahuá* and *Tindulí* in the Fatḥpur district, are the only surviving specimens of this once flourishing architecture in Northern India.

Persian and Arabic inscriptions were collected at Máṇikpur, Dúlmán, Safípur, Bángarmáu, Malláwán and Bilgrám, which will be published in the forthcoming numbers of the *Epigraphia Indica.*

Later in the season the whole Survey Party visited the Rohilkhand Division, *viz.*, the districts of Sháhjahánpur, Pilibhít, Barelí, Badáon, and Murádábád. Whilst Mr. E. W. Smith and the staff were engaged in preparing detailed drawings of the Jámi Masjid at Badáon, Dr. Führer visited Golá-Ráípur, which he identifies with the *Hi-lo* of Fa Hian; and Mátí in the Sháhjahánábád district; several ruined fortified cities buried in the Government Forests near Dhanáraghát, Suápára, and Sháhgaṛh of the Pilibhít district; the ancient sites near Pachómí (*Panchbhúmi*), Gwála Prasiddh, Attar Chhendí, and Rámnagar (the Buddhist *Ahichhattra*) in the Barelí district; Badáon (*Vodámayútá*), Sahaswán (*Sahasrabáhunagara*), and Kóṭ Sálbahan in the Badáon dis-

trict; Shambhal (*Sambhalapura*), Amrohá (*Ambikánagara*) and a great number of *kherás* in the Bilárí pargaṇa of the Murádábád district.

Badáon yielded a large stone inscription of *Lakhaṇapála*, of the *Ráshṭrakúṭa* clan, the eleventh ruler of *Vodámáyutá*. Iláhábás Dewal, in the Pilibhít district, furnished a big stone inscription of a petty chieftain, named *Lalla*, dated Samvat 1049, whilst at Rámnagar, in the Barelí district, several Buddhist railings and ornamental slabs of red sandstone were unearthed, containing dedicatory inscriptions of the Indo-Scythian period. A large collection of Arabic and Persian inscriptions, mostly written in Tughrá, Kúfí, and Bahárí, were obtained at Badáon, Sambhal, and Amrohá.

In the beginning of the cold season of 1888-89 the Survey visited the Jaláon and Jhánsí districts. Detailed drawings have been prepared of the Chaurási Gumbaz at Kalpí, the Jámi Musjid at Erichh and the great Chaturbhuj temple at Orchá. Several historically valuable records of the Chandela king *Kírttivarman* have been obtained at Gerahó, and a great number of Persian and Arabic inscriptions at Kalpí, Jaláon, Kunh, and Erichh.

At the end of December, Dr. Führer visited the Fort at Chunár, in order to see the so-called "cave-temple" which was reported to have been discovered during the progress of renewal of the retaining wall of No. 2 Battery, at the south-west corner of the Fort. He found six small rock-cut Śaiva images, representing Gaurí Śankar, Párvatí, Śiva, Gaṇeśa, and Rudra, and four short dedicatory inscriptions in characters of a very early type.

In January 1888, Dr. Burgess made extensive excavations in the Kankálí, Chaubára and Páli Kherá mounds at Mathurá, and was richly rewarded in finding a large number of Bauddha and Jaina relics, and several inscribed statues of the time of Kanishka. The Government of the North-Western Provinces and Oudh having again sanctioned a sum of Rs. 600 for archæological researches, Dr. Führer is at present engaged in excavating the Kankálí Tílá and, in the course of a few days, has unearthed the bell-shaped capital of an Aśoka lion-pillar, similar to that of the Lauriya pillar; a large number of Buddhist railings; several Buddhist images with inscriptions of the Indo-Scythian period, and two colossal statues of *Padmaprabhánátha* and *Mahávíranátha*, dedicated by the *Śvetámbara* community of Mathurá in Samvat 1038, according to inscriptions on their pedestals.

Dr. Führer's account of the Sharqi architecture of Jaunpúr, edited by Dr. Burgess, is in the press and will be illustrated by a large number of plates now being printed at the Survey of India Office.

Papers on 'The Ruins and Antiquities of Rampál,' by Mr. Asutosh

Gupta, and 'Notes on the Arthúná (Sanskrit) Inscription," by Kavirája Syamal Dás, have been read at our meetings and will be published in the *Journal*, Part I.

The *Madras Journal of Literature and Science* contains a 'Revised List of Antiquities in the Chicacole Taluq,' by the Rev. J. K. Hutchinson.

I must not omit to mention the very valuable "general Index to the Reports of the Archæological Survey of India, Vol. I to XXIII" prepared by Mr. V. A. Smith, which will be found most useful for reference.

### Geography and Surveys.

Although the records of geographical work in India and the surrounding countries during the past year appear to present no specially brilliant achievements, much good steady work has been done by the Survey of India in pushing on Surveys within our own territories and the countries immediately bordering them, as well as by foreign explorers in increasing our knowledge of the yet unexplored regions lying quite beyond our boundaries, and several interesting publications of travels and explorations carried out in former years have been issued.

To commence with the operations of the Survey of India:—

*Geographical Surveys and Exploration, Survey of India.*—The only purely exploratory work done, during the year has been the extension of the reconnaissance and approximate triangulation of Western Nepal, eastwards from the Kumaon boundary to the Gandak river, in Central Nepal, which completes the data for sketch maps along the whole Southern frontier of Nepal from Kumaon to Sikkim. No attempt was made to penetrate the Nepal country, and the greater part of the work had to be done by fixing some of the more prominent peaks and ridges from the tower Stations of the N. E. Longitudinal Series. The sketch maps thus obtained are necessarily imperfect, but are valuable as a basis for maps of this hitherto unknown region.

A complete report embodying a large amount of information regarding Bhutan and Tibet, collected by various explorers, is now in the press and will shortly be ready.

*Hukong Valley.*—Mr. Ogle accompanied the expedition under Mr. J. F. Needham, Political Officer at Sadiya, in his attempt to penetrate the Hukong Valley from Assam. The exploring party left Dibrugarh early in January 1888, and from Makum crossed the Patkoi range by the route traversed by Colonel Woodthorpe in 1884-85. Thence they proceeded by a route usually followed by people going to Assam from Namphai and places thereabouts, and after five days' marching arrived at a small Singpho village on the Namyung river. Owing to diffi-

culty in obtaining supplies the party was obliged to retrace its steps when only two days' march from the Hukong Valley. Mr. Ogle was able, however, to survey an area of 1,500 square miles of totally unknown country, notwithstanding delays by rain and foggy weather, and this is a valuable acquisition to geography, which will compensate in some measure for the failure of the expedition to reach its objective points.

The result of the Expedition, however, has been to establish the possibility of reaching the Hukong Valley by either of the two routes explored, *viz.*, that by the Nongyong Lake, Namyang and Daffa Nong's village, which is two days' march from Mainkhwom; and the other by the Nágá Hills route, through the villages of Yogli, Phung, Morang, Shange, Hasang, and Khulluk, to Sombia Nong's village, which is five marches from Mainkhwom. The Nágás south of the Patkoi were found to be very friendly.

Details of this Survey will appear in the forthcoming Annual Report of the Survey of India, now under preparation.

*Hazára Border.*—A survey party under Captain Wahab, R. E., accompanied the military expedition to the Black Mountain and Hazára country in October and November last, and surveyed and mapped on the half-inch scale a total area of about 500 square miles, including a considerable tract across the Indus, adjoining Buner, and of the Indus Valley above Thakot, which was sketched from commanding points. The triangulation extended over about 600 square miles and the heights of 24 points have been fixed trigonometrically.

The course of the River Indus has been definitely fixed to some distance north of Thakot, with the exception of some 13 miles between Judbai and the mouth of the Chakeswar River; but there it has been fixed approximately and its course determined within narrow limits.

It is to be regretted that the survey party had not the opportunity of reconnoitring the river route between Thakot and Kunhar, to enable the completion of the map with regard to the western slopes of the Black Mountain.

*Upper Burma.*—It is satisfactory to know that the Reconnaissance Survey of our newly acquired territories in Upper Burma is being vigorously pushed on, and a very large amount of work was done during the last field season by Major Hobday and his assistants, in connection with the various military movements undertaken for the pacification of the country.

Triangulation has been carried over an area of 23,274 miles, and the area of country mapped on the scale of 4 miles = 1 inch amounts to about 20,780 square miles.

A large-scale survey of the Ruby-mine tract has also been made,

comprising an area of about 77 square miles, of which 21 were surveyed on the scale of 6 inches, and 56 on the scale of 2 inches to the mile. Useful maps of the whole tract have been made.

The Survey of the Town of Mandalay on the scale of 40 feet to an inch has been completed.

The triangulation from Mandalay to Bhamo has been completed and extended thence to Senbo.

In the Southern Shán States, Captain Jackson has carried on a survey from Fort Stedman, down the valley of the Balu Chaung, to Pekon, making a detour through the Southern States of the Myelat. From Pekon he advanced to Loipok and eastwards, across the Pon and Tein rivers, to Maukmé, Mainghan and the Salwin River; thence proceeding northwards, *viâ* Moné, Legya and Maing-Kiang to Maingye and Mansé, and on, through Lashio, Mansam and Panglon, to Thibaw.

In the Northern Shán States, about 3,500 square miles was surveyed from Thibaw to Nansan and across the Myit-nge or Namtu River to Theinni, on the Salwín, and thence, *viâ* Maingyaw, to Mansé.

Materials thus exist for a reliable map of the Shán States.

The whole of the Yaw country has been thoroughly surveyed, and on the north a connection has been made with the work executed by Col. Woodthorpe's party last year in the Kubo Valley.

A considerable extent of country was surveyed by the surveyors accompanying the column which proceeded from Bhamo to Mogaung and thence to the Jade-Mines and Endawgyi Lake, returning, *viâ* Sakan and Mogaung, to Katha on the Irrawaddy. Surveys were made in the Katha District and the survey of the Irrawaddy downwards from Bhamo to Tigyaing completed. The Chindwin and Irrawaddy Rivers were also surveyed in the neighbourhood of their junction.

Further important results may be expected from the expeditions proceeding this season from Mogaung to the Kachin Hills and the headwaters of the Uru and Chindwin Rivers, and from the expedition to the Chin country, which will start from Kolewa. A third starts from Mogok, in the Ruby-Mines district, proceeding *viâ* Momeit to Taungbain and back; while another, starting from Bhamo will go south-east to the Shweli River and over Northern Theinni.

*Trigonometrical Branch.*—Triangulation has been extended down the Madras coast for 370 miles, thus completing the scheme for this part of the coast. The object of it was to fix the positions of beacons, temples, lighthouses and other conspicuous objects for the use of the Marine Survey of India and it now extends from False Point to Point Calimere in the Tanjore District. The party has been transferred to Burmah to carry on the triangulation there. A new 12-inch microscope

micrometer theodolite, by Troughton and Simms, has been procured for this work and it is intended to make the triangulation as perfect as the rest of India and to incorporate it therewith for the discussion of the earth's figure.

*Tidal and Leveling operations.*—The recording of the tidal curves by the self-registering tide gauges, their reduction, and the publication of the predicted heights have been continued as usual during the year at 18 stations round the coasts of India and Burma and at Aden. Work has ceased at Negapatam, where 5 years' observations have been completed, and at Elephant Point, where only $4\frac{1}{2}$ years' observations could be made, owing to the observatory becoming unsafe.

Two new observatories have been established, one at Tuticorin and the other at the entrance to Princes' Dock, Bombay, where the gauge s a new one by Legé and of a different pattern from any of the others in use in India. An observatory will probably be started at Mergui at once.

The following summary of the results of the predictions for 1887 is interesting, as showing the comparative accuracy of predictions and actuals.

| | Percentage of Predictions within 15 minutes of actuals. | | within 8 inches in height of actuals. | |
|---|---|---|---|---|
| | High-Water. | Low-Water. | High-Water. | Low-Water. |
| Open coast Stations | 56 | 52 | 98 | 98 |
| Riverain ... | 71 | 71 | 69 | 64 |

In connection with the tidal operations, spirit-leveling operations were carried out from Madras to Vizagapatam, *viâ* Nellore, Guntúr and Coconada, and from Chinsura to Nuddea, along the right bank of the Hughli River.

Tide tables for 1889 have been prepared which contain predictions of the heights and times of high and low water for 28 ports, being one more than in the volume for 1888.

I may mention in connection with this subject that the first volume of the Records of the Volcanic Eruption at Krakatoa, in 1883, lately published by the Royal Society, contains the reductions by Captain W. J. L. Wharton, R. N., of the observations of the Seismic Sea Waves, including those made by the automatic tide-gauges at different points round the coast of India and at Aden, of which a report was given by Major A. W. Baird, R. E., Survey of India, then in charge of the Tidal operations. The observations have all been reduced to Greenwich time, and show that the sea disturbance was probably composed of two descriptions of waves, *viz.* :—long waves with periods of over an hour, and shorter but higher waves with irregular and much

briefer intervals. To the north and east the long wave can be traced for about 450 miles. To the west it travelled over great distances, reaching Cape Horn and possibly the English Channel. To the south and east the propagation of the disturbance was limited. The shorter waves reached Ceylon and Mauritius. The velocities of the first great wave in mid-ocean, as observed at different points round the Coast of India, were; Negapatam 357 miles an hour. Madras 338. Vizagapatam 338. False Point 308. Dublat 351. Beypore 326. Bombay 331. Karachi 340. At Aden, 347 miles an hour.

*Electro-telegraphic Longitude Observations.*—The services of two astronomical parties, in charge, respectively, of Lieutenant-Colonels George Strahan and W. J. Heaviside, R. E., being available, the operations for the electro-telegraphic determination of arcs of longtitude were resumed in Southern India and seven arcs were measured, *viz.*—

From Nagarkoil to Bangalore, Madras and Mangalore and from Mangalore to Bellary (new). From Madras to Bangalore and Mangalore (revised); and from Mangalore to Bombay (completed); thus completing the South Indian work to Cape Comorin.

In the course of these operations Colonel Strahan has made experiments with the object of throwing light upon the causes of the errors which occur in the observations; and especially towards ascertaining whether the mere elevating or depressing of the telescope affected in any way its position in the meridian; or in other words, whether there is unequal flexure in the two halves of the transit axes acting at different altitudes in an uncertain and variable way, for which no law has yet been traced. The method employed was by comparison of observations on a star's transit by direct vision with those obtained from it by reflection from the surface of mercury. It is satisfactory to note that Colonel Strahan found from his experiments that the times of transit by direct and reflected vision differed by only ·05 of a second, and that with the least trustworthy of the two telescopes employed.

This season's measurements afford additional evidence towards establishing a curious geodetic fact which now rests upon so strong a basis as to be practically proved, *viz.*:—the deviation of the plumbline round the coasts of India in the direction of the sea. This fact has already been brought to notice in the preface to vol. IX of the "*Operations of the Great Trigonometrical Survey of India.*" The conclusion is based on the fact that, in every case of longitudinal arcs running east and west with one or both stations on the coast, the astronomical arc is less than the geodetic one, thus showing a displacement of the zenith in the opposite direction from the sea. The numerical results cannot be given at present, but the tendency is obvious and confirms the

evidence already obtained, by swinging pendulums and by levelling, of the increase of density in the submarine strata.

*Topographical Surveys.*—General Surveys, in continuation of those of former seasons, were carried on in Baluchistan, Gujarát, the Panjáb, Himalayas, and the Madura and Tinnevelly districts of Madras, as well as the reconnaissance survey of Upper Burma, as far as the movements of the troops would permit. Forest surveys were continued in Lower Burma, in the Belgaum and Thana districts of Bombay, and commenced in the Hoshungabad District of the Central Provinces.

It has been decided to postpone the Topographical Survey of the portions of the Madras Presidency still remaining unsurveyed, and the party that was engaged thereon will be exclusively employed on Forest Surveys for the Madras Government.

*Revenue Surveys.*—Cadastral Surveys, by which each plot of land held with separate occupancy rights is separately surveyed and the rights of the occupiers recorded, have been conducted in the Gorakpur, Basti, Mirzapur and Terai Districts of the N.-W. Provinces; in the Bilaspur Districts of the Central Provinces; the Nowgong District of Assam; the Thongwa District of Burma; also in two Government estates and in three Ward's estates in different parts of Orissa and Bengal. Traverse operations, designed so as to furnish a framework on which cadastral surveys are to be executed by the permanent staff of village surveyors and accountants, have been confined to the Central Provinces, and have been carried out over very large areas in nine districts. Several Districts in the Punjab have also been traversed for the construction of a new series of maps for the Province, from the Settlement Surveys; a large and important work which has made good progress. The new Survey of the Town of Calcutta, executed with great minuteness of detail on the scale of 50 feet to an inch, including the delineation of the boundaries of the separate properties, has been completed, and the drawing of the maps in a style suitable for publication by photozincography is now occupying the attention of the Surveyors. The new map is much wanted, the best available map being Simm's, which was made in 1847 to 1849 and has long been out of date.

*Publishing Offices.*—Very large numbers of maps and other subjects have been reproduced during the year by copper-plate engraving, lithography, photozincography, heliogravure and other photographic processes, not only for the Survey Department, but for many other Government Departments.

The amount of work turned out in the printing offices of the Survey may be judged from the fact that the total number of copies of maps &c. printed in Calcutta during the last Survey year was nearly a million.

*Trans-Frontier and other Geographical work.*—Turning now to other geographical work in Indian territories or in the countries adjoining our frontier, as recorded in the Journals and Proceedings of the principal European Geographical Societies, and proceeding from east to west.

*Tonquin and French Cambodia.*—The subject of the navigation of the Upper Mekong is attracting the attention of French geographers and officials. M. Pavie, the Vice-Consul of France at Luang Prabang, has succeeded a second time in travelling from Laos to Tonquin along the Black River. He ascended the Namu, a tributary of the Mekong, and from there reached Shán Territory. MM. Blanchet and de Fesigny have navigated in a small steamer the Preapatang rapids, hitherto regarded as impassable. M. de Fesigny has prepared a map of the Upper Mekong. M. Gauthier has successfully navigated the river from Luang Prabang to Khong, and proposes to establish two lines of steamers, one from Khong to Kemmarab, a distance of 185 miles, and the other from the latter point to the rapids 37 miles below Luang Prabang, a distance of 370 miles. During the season of high water, vessels of a mean tonnage can navigate the river as far as Stung-Treng. The object of these lines and other projects for the navigation of this great river is to prevent the diversion of the trade of the Laos country to Burma.

*Siam.*—Mr. J. M'Carthy, Superintendent of Surveys in Siam, contributes to the *Proceedings of the Royal Geographical Society* an interesting account of that country and of his journeys in the Malay Peninsula and the N. E. of Siam. The paper is accompanied by a map of Siam which is a very valuable contribution to our hitherto limited knowledge of that country.

A very interesting account of the Chieng-mai country, between the Salwín and the Mekong, by Mr. Archer, the Vice-Consul at Chieng-mai, has been recently published in *Parliamentary Papers* (Siam No. 2, 1888). Mr. Archer visited Nan, the most eastern of the Lao States, through a country hitherto almost unvisited by Europeans.

*Upper Burma.* The principal explorations in Upper Burma have already been noticed, but mention should be made of a very interesting description by Mr. Robert Gordon, which appears in the *Proceedings R. G. S.*, of the celebrated Ruby Mines, near Mogok, and of the country in their neighbourhood which has so long been a sealed tract to European travellers and trading enterprise, but has now been fully explored and mapped by the Survey of India Department.

*Lower Burma.*—The *Scottish Geographical Magazine*, for September last, gives an interesting abstract of the explorations in Tenasserim from Moulmein to Mount Mulai, the southernmost peak of the Dona Mountains, undertaken by Signor Leonardo Fea, who made large zoological and

botanical collections which have been made over to the Natural History Museum at Genoa.

*Hydrography of South Eastern Tibet.*—There has been considerable discussion in the *Proceedings of the Royal Geographical Society*, and the *Bulletin* of the French *Société de Geographie*, on the subject of the River systems of S. E. Tibet and the sources of the Lohit Brahmaputra and Irawádí. In a note "on the Hydrography of S. E. Tibet," which appears in the former, General Walker, C. B., our late Surveyor-General, refutes the theory brought forward by M. Dutreuil de Rhins that the sources of the Irawádí lie in Central Tibet to the west of the basin of the Lu; that the Kenpou, or Gakbo dsangpo, is the principal source of the Irawadí, and that a cluster of smaller rivers flowing northwards between the Kenpou and the Lu are its minor sources; and he shows that no Tibetan river west of the Lu can possibly be the source of the Irawádí; that most probably the Kenpou is the upper course of the Dibong and is joined by the Nagong Chu a little above the point where it enters the Himalaya mountains to make its way across them into Assam.

The erroneous nature of M. Dutreuil de Rhin's principal contention, that the Kenpou passes between Sadiya and Ríma on its way to join the Irawádí, is proved by the result of Mr. J. F. Needham's journey along the Lohit Brahmaputra between these two points, of which a very complete account has recently been published in the *Supplementary Papers of the R. G. S.* (Vol. II, Part 3), together with a good deal of information on the subject of former attempts to penetrate the Mishmi country by Wilcox, Griffith, Rowlatt and the French Missionaries Krick and Boury, who were murdered at Samé.

The geographical information gathered by Mr. Needham regarding the source of the Brahmaputra entirely corroborates the report of the Pandit A.-K., who visited the head waters of both its branches which unite close to Ríma. Mr. Needham saw the gorges of both these streams. The easterly one, the La ti, is called the Zayul Chu by the Pandit, and the westerly, the Mí Chu, or Rong Thod Chu, is said to rise at a distance of 15 marches from Ríma, in the same range as another river which flows away west into the Abor country and is, in fact, that eastern affluent of the Dihong called the Nagong Chu. Mr. Needham's discovery of the identity of the river of Ríma with the Brahmaputra also settles the doubtful question of the identity of the Sanpo with the Dihong, because we know from the Pandit that the Sanpo does not go into Burma round the sources of the Ríma river and can therefore only go into the Dihong, for which there is also the evidence of the Mishmis, and it may now be accepted as a fact.

On this latter question I may refer to an interesting report by Col. Tanner, which appears in the last Annual Report of the Survey of India Department, and may mention that a native explorer has been sent to make further observations about the lower course of the Dihong.

The many interesting problems connected with the sources of the five large rivers which, all flowing from the south-east corner of Tibet through a tract of not more than 400 miles in width, extend southwards and eastwards, and water an enormous tract extending almost from Calcutta to Shanghai, must await for their definite solution the further opening out of the hitherto sealed regions on our new Upper-Burma Frontier; but now that the question of new trade-routes between Burma, Assam and China is attracting the earnest attention of the Government in this country, we may hope in the interests of geography that it will not long be deferred. The geographical aspects of the question cannot be in better hands than they are with our late chief, General Walker, and his present successor, Col. Thuillier.

*Tibet.*—Tibet still remains impenetrable as ever to Europeans. A further attempt was to have been made last year by a Russian expedition, under command of the veteran traveller and explorer Prjewalski, to reach Lhassa, which had long been the dream of his life, but at the very outset of the journey he died, on the way from Tashkend to Vernyi, aged only 50. To the Russian nation and the still greater realm of science, the loss of a servant so devoted and untiring as Prjewalski, must be irreparable, but it is gratifying to know that his work is to be continued, and we may hope that sooner or later the dreary wastes of Northern Tibet, which have so long remained closed to all European explorers, will be opened out to science.

In the course of his four journeys to Central Asia Prjewalski traversed nearly the whole of Eastern Turkestan, the desert of Gobi and the country in the neighbourhood of the Yang-tse Kiang and the Hoang Ho, penetrating as far eastwards as Pekin. He re-discovered the Lake of Lob Nor, which no European had visited since Marco Polo. During the course of these journeys he made most extensive zoological and botanical collections which it will take many years to work out. Among his most notable 'finds' were the wild camel and the wild horse. The accounts of his four journeys have all been published and some of them translated into many European languages. The scientific results are still being worked out.

The following extract from a letter lately received by Dr. Prain from Mr. Maximowicz, the well-known Russian botanist, may be of interest. "He (Prjewalski) was a powerful man, and during the intervals between his travels devoted to book-writing (he never started for a new voyage

without publishing the last one) much inclined to become stout, and every time stouter. Beginning of fatty degeneration of the heart was the consequence, but when on a new voyage he used to train himself down and felt well again. He would have done so this time also, but got infected with typus, (typhoid or enteric?) fever somewhere; did not heed it but continued to hunt, march and expose himself to every weather, till five days before his end, when his heart would not stand the fever heat, and he succumbed in full possession of his mental powers."

The death of another well-known Russian explorer and anthropologist—Nikolaus von Miklucho-Maclay—during the year is also announced. He is best known in connection with the exploration of New-Guinea and the Malay Peninsula.

*Eastern Turkestan.*—By far the most interesting paper of the year on Asiatic Geography is Lieut. Younghusband's account, in the *Proceedings, R. G. S.*, of his journey across Central Asia from Manchuria and Pekin to Kashmir, over the Mustágh Pass. The part of the journey which more immediately concerns us is the description of the route from Yarkand up the valley of the Tisnaf River to the hitherto unexplored Chiragh Saldi Pass, between 15,000 and 16,000 feet in height, and then, by the Yarkand and Surukwat rivers, across the Aghil Dawan range, whence following the Shaksgam River he ascended the Sarpo-Laggo valley, near the grand peak K 2, and reached Suget Jangal, whence, with the greatest difficulty, he crossed the Mustágh Range by the old pass, the new one being closed, and made his way through Kashmir to Rawal Pindi.

An account has also recently been published of the travels of the three adventurous French explorers, MM. Bonvalot, Capus and Pepin, across the Pamir, in March 1887, noticed in last year's Address.

An interesting paper on the Tian Shan Range has been presented to the Geographical Society of Berlin by Herr von Krasnof, who visited those regions in 1886, in company with Ignatief, the geologist. His enquiries had special reference to the distribution of plants, and he notes the remarkable differences between the flora of the northern and southern slopes of the range, the former preserving many of the types which characterize the Alpine flora in Europe. He also notices the glacier features of the tract, and discovered some curious prehistoric rock-drawings showing that the horse was a domestic animal in very early times.

A Russian officer, Captain Grombtchevsky, has quite recently visited the Pamir region, the Mustágh Range, the Taghdumbask, and the country to the north of Baltistan. From the Ferghana territory he passed by Hai and Lake Karakol to the Southern Pamir region and found an encampment of Chinese Kirghiz on the Murghab. He passed

into Wakkan and by the Darkot Pass into Chinese territory, and on to Kanjut and Khunsa, penetrating as far as Raskun, but was unable to carry out his intention of visiting the Karakorum Pass and returned to Ferghana.

The Russian Geographical Society has published a new map of the present Russo-Afghan frontier, on the scale of $\frac{1}{840000}$, with an accompanying pamphlet by M. Kuhlberg, the Russian Commissioner, narrating the progress of the delimitation.

We have accounts of other explorers in these regions, but space does not allow me to refer to them in detail.

The opening Address, delivered by Col. Sir C. W. Wilson, R. E., as President of the Geographical Section of the British Association at Bath, is especially deserving of notice here in India, because in it he discusses the question of ancient and modern trade routes to the East, and shows how the construction of the Suez Canal, by making India immediately accessible from the Mediterrean, is causing a remarkable redistribution of the channels and trade centres of commerce between India and other eastern countries and the Western European nations, and that Great Britain is, in fact, losing the monopoly of the carrying trade from India which is being diverted to the ports of Southern Europe.

## Geology.

The general classification of the Indian formations has received its latest modification at the hands of Dr. W. T. Blanford, President of the Geological Society of London, in a note prepared for the late meeting in September last, in London, of the International Geological Congress; on the basis of classification given in the "Manual of the Geology of India," published in 1879, the most important alterations or corrections being the placing of the *Vindhyans* as lower Palæozoic, and a re-arrangement of the *Transition* series. The very obvious physico-geological division of India into Peninsular and Extra-Peninsular regions, with the great intervening one of the Indo-Gangetic-Brahmaputra plain, still necessitates the keeping up of two tables of classification, so long as the fact remains that no marine fossiliferous beds of palæozoic age have yet been discovered in the peninsular region. For the purposes of this Address it will suffice to give these two tables in condensed form, and homotaxially with the European Series.

## PENINSULAR INDIA.

| India. | | | Europe. |
|---|---|---|---|
| Blown Sand.—Cotton soil.—Modern Alluvium ... ... | | | Recent. |
| Older Alluvium.—Low-level Laterite.—Cuddalore Sandstones ... | | | Pliocene. |
| Upper Tertiary of Cutch.—Bone gravels of Perim ... ... | | | |
| Argillaceous beds of Cutch.—Miocene of Kattiwar,—Quilon beds ... | | | Miocene. |
| Arenaceous beds of Cutch ... ... ... ... | | | |
| *Orbitoides* Limestone of Cutch ... ... ... ... | | | |
| Nummulitic beds of Cutch and Gujerat.—High-Level Laterite ... | | | Eocene. |
| Upper Deccan Trap.—*Rana pusilla* beds of Bombay ... ... | | | |
| Lower Deccan Trap.—*Physa prinsepi* beds of Central India.—Lameta Group.—Bág beds.—Arialur, Utatur, and Trichinopoli stages ... | | | Cretaceous. |
| Neocomian of Cutch ... ... ... ... ... | | | |
| Gondwana System — Upper — 4. Cutch and Jabalpur ... | | Umia and Katrol of Cutch.—Tripatti Sandstones, Ellore.—Chari and Patcham of Cutch.—Ragavapuram beds, Ellore. ... ... | Jurassic. |
| Upper — 3. Kota-Maleri ... | | | |
| Upper — 2. Mahadeva ... | ? | ... ... | |
| Upper — 1. Rajmahal ... ... | | ... .. | |
| Lower — 4. Panchet ... ... | | ... ... | Triassic. |
| Lower — 3. Damuda — Raniganj ... / Barákar ... | | ... ... | |
| Lower — 2. Karharbari ... | | ... ... | Carboniferous. |
| Lower — 1. Talchir ... ... | | ... ... | |
| Vindhyan — Upper ... ... ... | | Bhanrer ... ... / Rewah ... ... / Kaimur ... ... | Devonian Cambro-Silurian. |
| Vindhyan — Lower ... ... ... | | Son.—Semri.—Kadapa. Kaladgi ... ... | |
| | | Arvali ... .. / Transitions of Behar and Shillong... ... / Ordinary Gneiss of Peninsula ... / Bundelkhand Gneiss ... | Archæan. |

## EXTRA PENINSULAR.

| | |
|---|---|
| Modern Alluvium ... ... ... ... ... | Recent. |
| Old gravels of the Himalaya and Sub-Himalaya.—"Karewas" of Kashmir ... ... ... ... ... | Pliocene. |
| Siwaliks of the Himalaya. Mammaliferous beds of Thibet. Upper Manchar of Sind. Dehing group of Assam. Fossil wood deposits of Burma ... ... ... .. | |
| Lower Manchar and Gaj of Sind. Lower Siwalik or Nahun of the Himalaya. Tipam group (Assam). Pegu group (Burma) ... | Miocene. |
| Upper Nari (Sind). Kasauli (Himalaya). Archipelago series (Andamans) ... ... ... ... ... | |
| Lower Nari (Sind). Mari Beds (Panjab). Dagshai (Himalaya) ... | |
| Khirthar (Sind). Nummulitic limestones (Sind, Panjab, Assam, Burma, &c.) ... ... ... ... ... | Eocene. |
| Ranikot (Sind). Lower Nummulitic (Salt Range, Panjab and Baluchistan). Gypsum and Rock-salt of Kohat (Panjab) ... | |
| *Palæocene, Cardita Beaumonti* beds and intercalated basalts of Sind. Olive group of Salt Range. Negrais group (Burma). Port Blair series (Andamans) ... ... ... ... | |

| India. | Europe. |
|---|---|
| *Hippurite* limestone of Quetta, Sind, &c. Chikkim beds, Himalaya. Dipsang group (Assam). Upper cretaceous (Khasi Hills). Mai-i group, Burma ... ... ... ... ... | Cretaceous. |
| Cretaceous of Mt. Sirban, Hazara ... ... ... | |
| Chichali Pass beds, Western Salt Range ... ... ... | |
| Jurassic of Salt Range. Giumal and Spiti stages, Himalaya ... | Jurassic. |
| Variegated group of Salt Range. Schists of Spiti ... ... | |
| Upper Tagling limestone, Himalaya. Silhet trap ... ... | |
| Lower Tagling and Para limestone. *Nerinœa* and *Megalodon* bed of Hazara ... ... ... ... ... | Triassic. |
| Lilang group, Himalaya. Axial group, Burma ... .. | |
| *Ceratite* beds, Salt Range. Lower Trias of Niti, Milan, and Spiti, (Himalaya) ... ... ... ... ... | |
| *Productus* Limestone of Salt Range. Kuling beds (Himalaya and Kashmir). Lower Trias and Tassol of Hazara ? Kiot limestone (Pir Panjal) ? Krol and Supra-krol (Himalaya) ? Mandhali of Garhwal. Maulmain series (Burma) ... ... ... | Carboniferous. |
| Wanting ... ... ... ... | Devonian. |
| Muth series (Himalaya) } ? Salt Marl, Salt Range. Blaini and Infra-Babeh series (Himalaya) } Blaini of Simla. Panjab System (Kashmir). Attock slates (Panjab)... | Cambro-Silurian. |
| Shillong series (Assam). Mergui series (Burma) ... ... | Archæan. |
| Ancient gneiss of the Himalaya .. ... ... ... | |
| Gneiss of Assam and Burma ... ... ... ... | |

Prof. Oberbergrath Dr. Waagen, formerly Palæontologist of the Survey, but now in the Polytechnic University of Prague, still retaining his hold on the study of Indian Geology, has within the last year published an exhaustive paper in the *Jahrbuch der K. K. Geol. Reichsanstalt*, Vienna, on the Carboniferous Glacial Period, which owes much of its value to observations and deductions made from time to time, since 1856, by the Geological Survey in working out the Gondwana Formation, particularly in connection with correlated deposits in South Africa and in Australia, glacial evidences of more or less importance having at the same time been observed in all. This correlation, and homotaxy, according to Dr. Waagen's latest deductions, is shown in the annexed statement.

| | South Africa. | India. | Eastern Australia. |
|---|---|---|---|
| Neocomian | Uitenhage | Cutch { Plant beds. / Marine beds. / Tithonian. } | ? Marine beds in Queensland. |
| Tithonian. | ..... ? | | |
| ? Rhætic and Jurassic. | Stormberg beds. | Jabalpur beds<br>Kota Maleri beds<br>Rájmahál beds | Bellarine beds.<br>Clarence River beds.<br>Southern coalfields, Queensland. |

| | South Africa. | India. | Eastern Australia. |
|---|---|---|---|
| ? Lowest Trias. | Beaufort beds. | Panchet beds | Wianamatta beds. |
| | | | *Unconformity.* |
| Permian. | Koonap beds | Damuda beds | Hawksbury beds (glacial). |
| Upper Carboniferous. | *Unconformity* | Kárharbári beds | Newcastle beds. |
| | Ecca beds (glacial) | Tálchir beds (glacial) | Stony Creek beds. Bacchus Marsh beds (glacial). |
| Lower Carboniferous. | Lepidodendron beds | Resting unconformably on crystalline rocks. | Stroud and Port Stephen's beds, &c. |
| | | | Lepidodendron beds. |
| Devonian. | Marine Devonian | ..... | Marine Devonian. |

The mass of evidence brought together in this elaborate paper, which treats of (I.) India, (II.) South Africa, (III.) Eastern Australia, (IV.) the Salt Range, and (V.) Europe, demonstrates, according to the author's interpretation, that a glacial period appeared with great intensity in upper carboniferous times on a continent, the greater part of which lay south of the equator, but which, later in the Permian period, extended itself over the greater part of the globe : and that, though many ice-made formations have been mentioned in geological literature as being of earlier or later age, at no time can such deposits be shown to have had such a wide extension as in the Carboniferous, or in the Quarternary periods.

Mr. R. D. Oldham gave a much needed and valuable paper, in the August part of the *Records of the Geological Survey of India*, on the "Sequence and Correlation of the Pre-Tertiary Sedimentary formations of the Simla Region of the Lower Himalayas;" founded on an amalgamation, as far as is possible, of the many isolated accounts which have been published of different portions of the range since the publication of the *Manual of the Geology of India* in 1879. He gives the following sequence, in descending order :—

Krol system.

Carbonaceous system. { *Carbonaceous division.* / *Blaini group.* / *Simla slates.*

Deoban system.

| | |
|---|---|
| Jaonsár system. | *Upper Jaonsár.*<br>*Jaonsár Quartzite.*<br>*Lower Jaonsár.* |
| 'Central Gneiss.' | |

In discussing the correlation of these systems with those of Stoliczka, Lydekker, Waagen, and Wynne, in Spiti, Kashmir and the Panjáb, as also the Vindhyans in Peninsular India: the conclusion is arrived at that the Central Gneiss is presumably of Archæan age; that the Jaonsár system may be equivalent to the *Vindhyan* in the Peninsular area, this correlation tending to give both systems an age corresponding at the latest to part of the Silurian system of Europe. No equivalent, however, can be found among the fossiliferous beds of the Central Himalayas for the Deoban limestone. The Carbonaceous system, in correlation with Lydekker's *Zanskars* and *Panjals* in Kashmir, and Stoliczka's *Kuling* of Spiti, is considered to have been deposited during the latter end of the Palæozoic period, and that it corresponds to part, if not the whole, of the Carboniferous and Permian eras. The Krol limestone is then considered as probably represented by part, which part cannot be determined, of the limestones which extend from Lower Trias to Lias in Spiti and Kashmir.

The attention of the officers of the Geological Survey of India appears to have been specially directed during the year to the elucidation and working out of several important questions connected with economic Geology.

As regards the economic importance of the *Dhárwár* series, further exploration points to an increased promise of their value, in the recognition by the Survey of an extensive and promising gold-field in the Raichur Doáb of the Nizam's Dominions.

An interesting question has been opened up, quite lately, regarding the occurrence of diamonds in the Madras Presidency, otherwise than in what has been hitherto considered the proper diamond-bearing sandstone *(Banaganpilis)* of the Karnúl formation. A few diamonds, one of them of considerable value, had been found at Wajra Kurur, where there is no trace now of the Banaganpilli beds from which they might have been derived: and it is supposed, with some show of plausibility, that the gems may have come from a "neck" of igneous or volcanic rock occurring there, which bears some resemblance to the "blue" of the Cape diamond-fields. It is doubted by the Survey whether the diamonds can be so derived, preference being given to the view that they occur in a remnant of the debris—present surface soils and gravels—of some pre-existing diamondiferous portion of this "neck" rock which had passed through carbonaceous deposits long since denuded from the face of the country.

The enquiry into the quality and extent of the Manganese deposits in the Jubbulpore District has been completed, with an estimate of over 75,000 tons of available pyrolusite; the manganese hematite being considered practically unlimited in its extent. The geological interest attaching to this enquiry lies in the question of the origin and mode of distribution of the pyrolusite, which also partly occurs in what may be called a manganese laterite, in contrast to the ordinary or ferruginous rock of that name. The distribution of the pyrolusite in this laterite and other superficial deposits, or in the outcrops of the rocks, is attributable to a deposition by leaching out of a manganese carbonate from the adjacent manganiferous hematites; while the occurrence of manganese laterites points to a probably more extended, though local, distribution of manganese ores among the widely distributed laterites in the peninsular region than has been previously anticipated.

During the enquiry into the conditions of the Sapphire-bearing rocks of the Zanskár district in Kashmir, a very interesting confirmation was made of the find of *nummulites* by Dr. Thompson in 1852; more particularly so as this occurrence which had been adopted by MM. d' Archiac and Haime in their classic work on the Nummulitic fossils of India, had been since questioned by Mr. Lydekker in his "Geology of Kashmir."

A Memoir on the Physical Geology of the Sub-Himalaya of Garhwal and Kumaun, following on the surveys of Mr. C. S. Middlemiss, will shortly be published. The more interesting subjects treated of in the author's general considerations, are:—absence of metamorphism; no evidence of glacial conditions; each reversed fault represents an ancient shore-line, or mountain-foot, *i. e.*, a limit of deposition; contrast of the south face of the Himalaya with the eastern aspect of England; the disturbance of the Sub-Himalayan rocks not representative of that of the older rocks; abstract theories of mountain-making; consideration of Mr. T. Mellard Reade's theory and the Rev. O. Fisher's "Physics of the Earth."

The oil region of Makum, in Assam, has undergone additional examination by Mr. R. A. Townsend, Superintendent of Petroleum-Works in Baluchistan: his report of the oil-shows and the possibilities of this tract being most favourable. A certain amount of caution must, however, be observed in forming an estimate of the value of the oil, for the present, at least; because the results obtained in the Geological Survey laboratory, from examination of the sample of oil brought down by Mr. Townsend, agree very closely with that already given by Prof. Boverton Redwood, (Cantor Lectures on Petroleum and its products) from an assay of petroleum from Assam, where he obtained no percentage of burning oil, 94·2 per cent. being merely lubricating oil. It must be

noted, however, that Mr. Townsend's sample was taken from the surface; whereas a true estimate can only be formed on oil taken from a bore-hole.

In connection with the subject of petroleum beds, mention may be made of a recent theory, advanced by Professor Mendeléeff, that petroleum is of mineral origin, and is formed by the combination of water with glowing metallic carbides, chiefly iron, below the crust of the earth; whereby it is decomposed, the oxygen uniting with the iron, while the hydrogen takes up the carbon, and ascends to higher regions, where part is condensed into mineral oil and part remains as a natural gas.

Strictly geological work in Burma is still subservient to the examination of economic products such as the oil-tracts of Thayetmu, Yenangyoung, &c; iron ore near Shengaung in the Shan Hills; and the Ruby-bearing limestones of Kya-nhyat: while only lately attention has been directed to the Tin ores of Tenasserim, in connection with a mission which has been carried out in Perak, with the view of ascertaining the system of Chinese labour there utilized.

The *Quarterly Journal of the Geological Society* contains some papers bearing on Indian Geology, among which the following may be noted:—"On the law that governs the action of Flowing Streams," by Mr. R. D. Oldham. "On some of the auriferous tracts of the Mysore Province. Notes on the Melkote and Seringapatam areas and general observations," by Mr. G. Attwood.

A paper on "certain features in the Geological structure of the Myelat District, Upper Burma, as affecting the drainage of the country," by Brigadier-General Collett, C. B., has been read to our Society, and will be published in an early number of the *Journal*.

## Meteorology.

In Indian Meteorology, I am informed, the past year was one of steady progress. It was (probably) that of minimum sun-spots of the present cycle, and like its predecessor of the two previous cycles, 1866 and 1877, has been characterised by very marked abnormal deviations and weather features. The hot weather was unusually severe and several tornadoes and hailstorms of almost unexampled violence occurred in Bengal and Upper India. Interesting and valuable accounts of two of those storms, *viz.*, the tornado at Dacca in April last, in which 118 people were killed, and the hailstorm of May at Moradabad, in which 150 people were killed or frozen to death, have been presented to the Society by Messrs. Pedler and Crombie, and Hill. The commencement of the south-west monsoon was marked by a very abnormal retardation of the monsoon current at the head of the Bay for upwards of a fortnight, during which the heat was

almost unprecedented in South Bengal. The South-West monsoon was also characterised throughout by great variations. But fortunately the total distribution of the rains has been such as to avert the famine threatened by prolonged partial drought on more than one occasion in several districts, more especially in Orissa. The experience of the past year, however, tends to confirm the general conclusion of the meteorology of the past 22 years in India, *viz.*, that the greatest irregularities and abnormal deviations in the weather over India occur at the minimum sun-spot period or at (according to Lockyer) the period of least activity in the solar photosphere.

It may be noted that these abnormal features of the weather have not been confined to India; the summer months in Europe were unusually cold and wet, and marked by snowstorms and floods. In America also, remarkable blizzards occurred in the months of January and March, over the States of Dakota and New York, which caused great destruction of property and loss of life to man and beast, owing to the intense cold and violence of the wind. In Australia the hot months have been marked by great drought.

Several improvements have been made during the year in the methods of preparing and issuing the daily weather-charts and storm-warnings. The hour for recording the observations daily transmitted by weather-telegram to Simla, Calcutta and Bombay has been changed from 10 A. M. to 8 A. M., which is more in conformity with European practice. The telegraph lines being most free from traffic between 8 and 10 A. M., the weather messages are now forwarded without delay and the daily reports can be issued several hours earlier than in previous years. The Calcutta daily Report and Chart can thus be issued at about 11 A. M., or at the beginning of the office day instead of at the end of it; thus practically securing the gain of a day. The Simla daily Report is also issued from 12 to 24 hours earlier, and delays are now mainly due to the great distance between many of the Observatories and the Telegraph offices. In future this will be remedied as far as possible by establishing all new Observatories at Telegraph offices. This will not only facilitate the telegraphic communication of observations, but in many cases provide observers of greater intelligence than would be otherwise obtainable.

Satisfactory arrangements for the warning of the Burmah and Madras Ports of the occurrence of cyclones and cyclonic storms were effected and sanctioned in the beginning of the year. The duty of warning all ports on the Bay of Bengal Coast is assigned to the Meteorological Reporter to the Government of Bengal. An unusually large number of cyclonic storms, one or two of which were of a very exceptional character, occurred during the past year, but in every

case ample and sufficient warning was given to the Bay of Bengal Ports. During the prevalence of such storms in the Bay, the Reporter has an exceedingly responsible and most arduous task to perform night and day till they disappear, and on this account the Society has to regret the loss of Mr. Pedler's valuable services as Treasurer, the strain of constant work and anxiety having obliged him to give up all extraneous work. It is satisfactory to know that arrangements have been made for giving the Reporter assistance at such times.

The duty of warning the West-Coast ports was transferred to the Simla Meteorological office in August last. The system in force differs from that followed for the Bay of Bengal Ports and has been found unsatisfactory, because it is limited to the warning of the Ports of approaching storms and not to the warning of ships in ports of the existence of distant storms in the Arabian Sea which they might encounter if they left port. The disaster to the *Vaitarna* (which went down, with 800 persons on board in November last, during a storm in the Arabian Sea that only slightly affected the coast ports) has drawn attention to the defects of the signal system, and it is hoped it will soon be placed on a satisfactory footing.

The Government of India has recently sanctioned a series of changes, most of which came into force on the 1st of January last. One of the most important is the more systematic collection of observations of storms than has yet been attempted. It may be desirable to point out that storms in India may be classed as follows :

1st, Cyclonic storms of the South-West Monsoon.

2nd, Cyclonic storms of the North-East Monsoon, or cold-weather storms, during which by far the larger proportion of the winter rainfall of Upper India and the snowfall of the Himalayan area occurs.

3rd, Hailstorms, Nor'-westers, Tornadoes, and other small but excessively violent storms of the hot weather, which occur chiefly in the neighbourhood of the seas and hills.

4th, Duststorms, such as occur frequently in the hot weather in the driest districts of N.-W. India.

Much labour has been devoted (and on the whole successfully) to the investigation of the first two classes of storms. Little has, however, been done to elucidate the meteorological features of the last two classes. District officers, who have ample opportunities of collecting local information, could provide important data, if they occasionally ascertained the extent, exact times of occurrence and variations of intensity of the more severe hot-weather storms in their Districts. It is highly probable that the Nor'-Westers of Bengal are of very limited extent. Usually, however, a large number of these detached storms appear to occur about

the same time of day in different parts of Bengal and Assam during periods of slight general atmospheric disturbance in Northern India. If the conditions happen to be unusually favourable, these Nor'-Westers may occasionally develope into or include a tornado, as in the case of the Dacca storm.

The most important addition sanctioned by Government undoubtedly is the systematic collection of observations recorded in the logs of vessels entering the ports of Bombay and Calcutta, with a view to the early publication of daily charts of the whole area, including India, the Indian Seas, Baluchistan, Afghanistan, South Arabia and Persia. It is hoped that this extension will throw much light on the causes of the variations in strength of the South-West Monsoon current on land and at sea, and also upon the origin of the cold-weather storms of Northern India. It may be hoped that some day it will be possible to obtain observations from various parts of Russian Asia which might also be of use. Although Indian Meteorology is chiefly affected by influences coming from the Bay of Bengal on the one side and the Arabian Sea and Indian Ocean on the other, the colder currents from the regions to the far north must exert some influence on the equatorial currents, and a knowledge of the meteorological conditions prevailing in those northerly regions might possibly be a guidance to meteorologists here.

Mr. H. F. Blanford, late President of our Society, has fully completed during the past year his very valuable Monograph on the Rainfall of India, and it is now issued as a separate volume of the *Indian Meteorological Memoirs*. He has also written during the year several papers on questions connected with Indian Meteorology which have appeared in the Royal Society's '*Transactions*' and in '*Nature*.' He has also completed a work on the Meteorology of India, based on the publications of the Meteorological Department and giving a popular exposition of the more important features of the climate and weather of this country. It will not only increase the interest taken in Indian Meteorology but, it is hoped, lead to greater attention on the part of European meteorologists to the problems it presents.

Mr. Eliot has also continued his researches into the nature, origin and paths of the cyclonic storms generating in the Bay of Bengal, and has during the year contributed two papers to the *Indian Meteorological Memoirs*, the first giving a list and brief account of the south-west monsoon storms in the Bay of Bengal during the years 1882 to 1886, and the second giving the full history of the cyclonic storms of November and December 1886 in the Bay of Bengal. The history of these three interesting storms, which succeeded one another at intervals of about a fortnight, appears to support the condensation theory of the formation of cyclones which has been so ably advocated by Mr. Eliot.

Mr. Eliot has during the year also worked out in detail the history of the formation of the cyclone which visited Balasore on May 26th 1887, and caused the loss of the steamers *Sir John Lawrence* and *Retriever* at the mouth of the Hooghly. The description of this cyclone is given in a new publication of the Meteorological Department called "*Cyclone Memoirs*," of which this forms the first part. This publication is intended to contain short descriptions of cyclones in a form suitable for issue to ship-captains, and to be issued as soon as possible after the occurrence of the storms described. The first part also contains some very valuable suggestions to sailors as to the best course for them to pursue in the case of their meeting similar storms.

Mr. F. Chambers has published during the year, in the *Indian Meteorological Memoirs*, a full description of a cyclone which occurred in the Arabian Sea in May 1881, in which he investigates very thoroughly the connection between the wind direction in the storm and the position of its centre, and the relation which the direction of the movement of the storms bears to the direction of the normal monsoon wind blowing at the time of its formation.

Of the Meteorological papers printed in our *Journal*, the first is a description, by Messrs. Crombie and Pedler, of the severe tornado at Dacca, in April last, in which it appears to be proved that the storm followed Meteorological conditions similar to those which usually precede tornadoes in the United States, in which country the subject of tornado formation has been worked out to the fullest extent by the Signal Services, under Lieut. J. P. Finley, U. S. A.

The second paper was by Mr. S. A. Hill, on "The Tornadoes and Hailstorms of April and May 1888 in the Doab and Rohilkhand," and in it he discusses the origin of such disturbances, and shows that the tracks of the tornadoes have no apparent relation to the distribution of temperature or pressure at sea level, but the disturbances probably originate in the eddies in the stratum of the atmosphere where cloud formation and precipitation commence, at a level of 9000 to 10,000 feet.

Mr. Hill has also published two other papers; one, on "The Annual Variation of the Barometer in India," in the *Met. Zeitung* for September 1888, in which he points out several features which are still ignored by European meteorologists: notably (1) that the annual variation at all stations north of 20° is accompanied by one of semi-annual period; (2), that the annual variation diminishes in range as the elevation increases, and probably dies out or becomes reversed in direction at 14,000 or 15,000 feet; (3) that the annual range is greater in Central India and along the southern edge of the Gangetic plains than at the foot of the Himalaya. This is very important, as it is the direct cause of

the easterly winds of the summer monsoon in the Gangetic valley and the westerly winds of the cold-weather in the same region.

The other paper, on "The Life-Statistics of an Indian Province," appeared in "*Nature*," and in it the relations obtaining between vital statistics and weather, in India, are illustrated by the Statistics of the N. W. P. and Oudh for the ten years ending with 1887. The annual death-rate is shown to vary with the rainfall with great regularity. The birth-rates vary from year to year, according to the health of the people and the abundance or scarcity of food.

In connection with Indian Meteorology the progress of Meteorological work in northern Australia and China is deserving of notice.

Mr. Wragge, the Government Meteorologist of Queensland, now publishes a daily report with chart and forecasting the weather in the Australian area, based on telegraphic reports from 72 stations in Australia, Van Diemen's Land and New Zealand. As Australia occupies nearly the same geographical position (lying betwen 10° and 38° parallels of latitude) in the southern, that India does in the northern hemisphere, there is little doubt that progress in Australian Meteorology will not only react on Indian Meteorology, but throw much light on many of the larger problems with which Indian meteorologists have to deal.

Dr. Doberck, Director of the Hongkong Observatory, is also doing very useful and valuable work in China, where a general system of meteorological observations is also being organised.

Mr. Meldrum continues to collect systematically important information respecting the Indian Ocean from ships visiting Mauritius. It will hence soon be possible, by combining the information collected by these various Meteorological Departments to obtain a fairly complete idea of the larger weather features and changes in the whole area including China, India and Australia and the adjacent seas, and it would be very desirable that this work should be undertaken if only for a limited period.

*Comparison of Earth Thermometers.*—The records of the observations of temperatures of earth thermometers sunk at different depths, at the Survey of India Trigonometrical Branch Office, Dehra Dún, show some very curious results, one particularly noticeable being that the maximum at a depth of 25·6 feet occurs almost invariably in November, the maximum mean shade temperature at the surface being usually in June, but sometimes in May. Taking the means of the five years recorded, the earth temperature at a depth of 25·6 feet in November is 76·64° F., as compared with a mean temperature of 73·54°, in the shade at the surface.

On the other hand, the minima are usually in April or May. Taking the means of the six minima recorded and comparing them with the corresponding shade temperature at the surface, we have a mean minimum earth temperature of 73·94° F., against a mean surface shade temperature of 91·97°. The minimum earth temperature at 25·6 feet, of which records are given, is 73·50°, in May 1887, and the maximum 77·33°, in October 1884. The minimum mean surface shade temperature during the same period was 59·79°, in January 1887, and the maximum 98·66°, in May 1887.

The common practice up-country of building taikhanas under houses, and excavating chambers about deep wells, as one often sees in Central India and Rajputana, with the object of having these chambers warm in winter and cool in summer, is thus found to agree with scientific observation.

Barrisal guns.—Babú Gaur Dás Bysack has again called the attention of the Society to the peculiar explosive sounds, occurring about the Sundarbans, and known as the "Barrisal guns." A memorandum, giving an abstract of the information recorded on the subject, was drawn up by me and read at the March meeting. A considerable amount of interest was evinced in the subject and a Sub-Committee was appointed to investigate it anew. The Sub-Committee drew up some rules for observers and circulated them, with the memorandum, to the Meteorological Offices, Marine authorities, District officials, and other persons likely to be able to afford assistance and information. Numerous replies have been received, but as yet nothing to show definitely the cause of these mysterious sounds. The observations will be examined and collated immediately and laid before the Society. One of the most suggestive communications on the subject is a letter from Mr. Manson of Chittagong, who, among other likely causes for the sounds, suggests that they may be caused by the breaking in of the dry crust of mudbanks, due to the washing out of the soft semi-fluid mud beneath, and the sudden escape of the imprisoned air; the sound thus produced being multiplied by echoes. Valuable observations were also sent in by Mr. Waller, the Collector of Jessore and by Dr. Crawford, Civil Surgeon, Barisal, also by Mr. Elson, of the Pilot Service.

## Chemistry.

Reviewing the progress of chemistry in India during the year we find no records of pure chemical research. In applied chemistry, which perhaps in some ways is more important, good work has been done. The vast and, until within comparatively recent years, unexplored field which India affords for investigation on the chemical, and other valu-

able properties of its abundant indigenous vegetable products and drugs has engaged the attention of some of our chemists.

In Bengal, Professors Pedler and Warden have published in our *Journal* an account of their investigation of the properties of Bish Kachu, a member of the large family of *Aroideæ*, a natural order of which some species in most parts of the world bear an evil reputation. In India, especially, certain arums are held to be highly toxic, and the paper contains valuable information regarding the whole family. The results obtained indicate that the toxic symptoms induced by ingestion of the *bish kachu* are referable to the mechanical irritation caused by the raphides, or minute needles, of calcic oxalate which are found in all parts of the plant, and not to the presence of any specific poisonous principle.

They have also examined the bark of the *Anona squamosa*, or custard-apple tree, and from it isolated a crystalline neutral principle, an acid resin, and a viscid neutral body. Also the dried carpels of *Xanthoxylum elatum*, which had some years previously, been the subject of a research by Dr. Stenhouse, who obtained from them an essential oil and a stearopten. Messrs. Pedler and Warden have determined some of the physical constants of the essential oil but have failed to isolate a stearopten. They also separated a fixed oil, and a yellow acid principle.

Few drugs have within the last few years caused greater interest than the alkaloid cocaine, contained in the leaves of the *Erythroxylon coca*. Though the stimulating property of the leaves when chewed was known to the Indians of Peru more than 300 years ago, it was not until Koller pointed out, in 1884, the remarkable anæsthetic properties of cocaine, that the drug received attention from the medical profession. In 1884 the price of this alkaloid was about 2*s*. 6*d*. a grain and the demand was almost greater than the supply. The cultivation of the plant thus appeared likely to prove profitable. Seedlings of it were distributed to various tea-gardens by the Agri-Horticultural Society of India, and last year Dr. Warden examined a large number of samples of locally grown leaves and found that they were exceptionally rich in alkaloid, and that physiologically the drug is in no way inferior to that obtained from other sources. His investigations were published in the Journal of the Agri-Horticultural Society of India.

During the foregoing investigation Dr. Warden isolated cocatannic acid. The acid hitherto described under that name, and first observed by Wackenroder and Gaedecke, is probably a decomposition product of the acid now isolated for the first time.

He has also isolated the active principle of the berries of the *Embelia ribes*, the 'Barbarang' of native materia medica, which have long been

highly esteemed as a vermifuge in this country. It is a golden coloured crystalline acid, and he has designated it *Embellic acid.*

From *Delphinium zalil*, a drug used chiefly in Bombay for dyeing silk, but also believed to possess medicinal properties, he has isolated a yellow acid and certain other principles; and from the stems and roots of the *Cocculus villosus* obtained a bitter alkaloid and other principles. An examination of the bitter oil contained in the almond of the *Melea azadirachta*, or *Nim* tree, commonly called 'Margosa oil,' shows it to be highly complex in composition. This oil had already been examined by Dr. Cornish in 1856, and from it he isolated a substance called margosic acid, but did not investigate its composition or properties. Dr. Warden's results will be found in the Pharmaceutical Journal.

It is to be hoped that Messrs. Pedler and Warden will continue these interesting researches. The demand for new medicinal principles is unceasing, and if openings can be made for the encouragement of the cultivation in this country of the plants containing them, the benefits to the world at large and to this country will be great.

It is not often that a chemical manufacturing process has origin in India. This year, however, has been marked by the invention and application of a very ingenious process for the manufacture of quinine from cinchona bark. It depends on the solvent action of fusel oil on the cinchona alkaloids; and is actually worked by agitating very finely powdered bark, which has previously been mixed with an alkali, in a mixture of fusel and kerosine oils. The alkaloids displaced by the alkali from their natural combinations in the bark become dissolved in the mixture of oils, from which they are in turn recovered by the addition of dilute sulphuric acid. From the acid solution thus obtained the crystals of sulphate of quinine ultimately form out, and by a slight subsequent purification are ready for use. This beautiful and simple invention was originated by Mr. C. H. Wood, lately Quinologist to the Government of Bengal; and it has been worked out by Mr. J. Gammie, resident manager of the Cinchona plantation near Darjiling. By making the invention public property, the Government has thus completed the task, which it began in 1861, of so cheapening the only remedy for the commonest disease of the tropics as to put it within the reach of the poorest sufferer.

In Madras, Mr. David Hooper, the Government Quinologist, has examined the leaves of the *Adhatoda vasica*, or "Arusa," a widely distributed plant used in medicine, as a dye, and also in agriculture. The latter use is interesting. In the Sutlej valley the fresh leaves are scattered over recently flooded fields, under the idea that they act as a manure and also poison the aquatic weeds that otherwise would injure the

rice crops. The leaves and extracts are also valuable as insecticides, the alcoholic extract of the leaves being an intensely lethal poison to all the lower orders of animal life, while producing no appreciable effect on healthy animals of the higher orders. From the leaves Mr. Hooper has isolated a well defined alkaloid, *Vasicine*, and an acid which he has termed *Adhatodic acid*.

The rhamniads, or buckthorns, have long been known to yield important products used in medicine and the arts. The berries of some of the European varieties of *Rhamnus* have been examined by Lefort, Stein and Schützenberger and certain crystalline glucosides obtained, but so far the cathartic principle was unknown. The introduction of the bark of *R. frangula* and *R. parshianus* into the last British Pharmacopœia led Mr. Hooper to examine the bark of an Asiatic species, *R. Wightii*, from which he has been able to isolate *Cathartic acid*, a crystalline body, several resins, resin acids and neutral principles.

Another bark examined by Mr. Hooper has been that of the *Michelia Nilagirica*, one of the most abundant and perhaps most characteristic of the forest trees of the Nilgiri Hills. The bark appears to have lately attracted some attention on the Continent as a source of a new aromatic essential oil, and it is believed to possess febrifugal properties.

Mr. Hooper communicated two interesting papers to the last annual meeting of the Pharmaceutical Conference, one on "Carthagena bark"; the other on the "Hybridisation of Cinchonas."

In Bombay we learn that Dr. Dymock, the well-known authority on Indian Materia Medica, is preparing a third edition of his work on indigenous drugs, under the title of the *Pharmacographia Indica*. It may perhaps be mentioned, as an indication of the high appreciation in which Dr. Dymock's investigations on Indian drugs are held in England, that he was lately awarded the Hanbury medal at a meeting of the Pharmaceutical Society of Great Britain.

It will thus be seen that good progress is being made in the working out of Indian drugs, &c., but entirely by the European officers of Government, though the subject is one which might have been expected to have attracted the attention of native students of medicine more than it appears to have done. It should be mentioned, however, that Mr. John Taswoo White, a native of Burma, has published in the '*Chemical News*' communications on "Analytical Processes."

### Telegraphy and Electrical Science.

Not the least important among the practical sciences is Telegraphy, and to us in India, where we have to maintain not only a largely increasing daily communication with Europe and other foreign countries,

several thousands of miles away, but also a series of inland lines of perhaps greater extent than any other country in the world, except Russia and the United States, any means of increasing the carrying power of the lines must be of special importance. It is satisfactory, therefore, to be able to record that during the present year the system of quadruplex telegraphy has been perfected in India, so that four messages can now be transmitted simultaneously over the same wire, two in one direction and two in the other. Bombay and Madras work quadruplex direct; Calcutta works quadruplex with Agra or Allahabad on one line, and with Akyab or Rangoon on another; and the results obtained over these very long circuits have been most satisfactory. The system in use is the same as that used in America and in England, with the apparatus altered in certain important respects to suit the conditions of Indian telegraphy. Four signallers are employed at each end of the wire, two in despatching messages and two in receiving them, each man working a separate instrument. One wire thus keeps eight men fully employed, and it is easy to conceive the great saving in plant, thus gained. The difficulties met with at first have now been all overcome and the future extension of the system in India depends only on traffic requirements. It will be within the memory of many of the members present that our lamented fellow-member Louis Schwendler took a very prominent part in the introduction of Duplex telegraphy into India, and described the general theory of its working very fully in our *Journal*, Part II, for 1873-74-75. It would have been a great pleasure to him could he have lived to see the perfection and extension of his labours.

Another great advance in Indian telegraphy is the substitution of hard copper wire for the ordinary galvanised iron wire. The trials of the copper wire were so satisfactory, that it has now been put up for the whole distance (800 miles) Bombay to Madras, also from Bombay towards Nagpur, and on shorter sections. The great advantages of copper wire lie in its high conductivity and virtual freedom from electro-magnetic inertia, which tends to retard the flow of the electric current through iron wire. This really means that within certain limits two offices will work as well with one another through 1000 miles of copper wire as they would through 500 miles of iron wire. It is on this copper wire that Bombay and Madras work quadruplex direct and work excellently; in fact, better than they formerly did on an iron wire, which necessitated automatic repetition or translation at Bellary.

Another improvement to be recorded is the introduction of mica 'lightning-dischargers' in telegraph offices. These lightning-dischargers are placed at either end of a telegraph line where it enters an office, in

order to protect the signallers from the destructive effects of lightning. Hitherto the so-called "plate-lightning-discharger" has been in general use in India. The upper plate has two screws, to one of which is connected the line wire entering the office, and to the other the telegraph apparatus. The lower plate is connected direct to the earth. The two plates on the sides facing each other are finely grooved in parallel lines, the grooves in the line-plate crossing those in the earth-plate at right angles, so that each crossing approximately represents two cones with their points facing each other, with a small space of air between them; and the more numerous such crossings, and the smaller the air-space, the more efficient the discharger.

However, actual experience in India and, very recently, a long series of laboratory experiments, certainly seem to show that a greater amount of protection can be obtained by employing two perfectly smooth metal surfaces separated only by a thin sheet of mica, two or three circular holes being cut in the mica to admit of the discharge passing between the plates and so to earth. The reason of this greater protection lies in the fact that mica possesses at least five times greater capacity or power of drawing in charges of electricity than air has. For example, if two comparatively small plates separated by mica, and two much larger plates separated by air are connected up 'parallel' or 'in series,' in a circuit in which currents of high potential are generated, it will be observed that the sparks all pass between the mica-separated plates and none at all between the air-separated ones.

It may be noted that in 1846 Steinheil used a plate-discharger with a sheet of silk as the insulating medium, the principle of action involved being in a lesser degree exactly that of the new mica discharger.

The use of telephones is extending, and during the year they have been adopted in the Harbour Defence Works, Bombay and Karachi, for giving orders and information. They have been found useful in the construction of railways and, especially, in difficult tunnelling works. Also in station-yards, where it is necessary for a Station-master to convey simultaneous orders to three or more signal-boxes regarding the shunting of trains &c. They have been used at rifle ranges instead of the old system of flags, or in addition to it.

A system for recording the hearing powers of persons, especially those under treatment for deafness, by means of an arrangement of telephone and electrical resistance has been devised and will no doubt be tried in our hospitals. A record of hearing can be kept as accurately as a record of weight is now kept.

Electric lighting is slowly making its way in India, but the almost prohibitive cost of installation prevents its extended adoption in place of gas.

A very interesting sketch of the History of Telegraphic communication between the United Kingdom and India, by General Sir R. Murdoch Smith, appears in a recent number of the *Scottish Geographical Magazine.*

### Photography.

You will doubtless expect me to tell you something of recent advances in photography: there is, however, little to tell.

It is gratifying to note the resuscitation of our local Photographic Society and the establishment of new Societies at Bombay, Allahabad and Madras as an indication of the awakened interest in photography brought about by the perfection and simplicity to which the working of gelatine dry plates has now arrived. To the archæologist these plates are invaluable and permit of an immense deal more work being done than was the case with the old collodion methods, wet or dry. With these plates, which need not be developed on the spot, the explorer can now obtain far more trustworthy records of the strange places and people he visits than was formerly the case when all had to be done by hand and eye. Great improvements have also been made in printing methods, both solar and photo-mechanical, which greatly facilitate the reproduction of photographs for book illustration.

As the recording pencil of Science in all branches the use of photography is daily extending. In astronomy, microscopy and spectroscopy, especially, its powers of revealing the invisible are invaluable and almost indispensable for research. Photographs have been lately taken of nebulæ which the most powerful telescopes fail to show to the eye. A complete photographic Survey of the Heavens has been arranged for internationally, and I should have been glad to have seen this country taking part in it, but special instruments and arrangements would be necessary, for which it would be hopeless to ask the aid of Government at present, while so many more important things remain to be done.

Photographic observations of sunspots and faculæ are made regularly every day, weather permitting, at the Trigonometrical Branch office, Survey of India, at Dehra Dún, on 8-inch plates and—when any large spots of special importance are visible—with the large photoheliograph, which gives images of 12 inches diameter. Copies of the negatives are sent home to complete the Greenwich observations. The advantage of having this observatory at Dehra Dún is shown by the tables of comparative visibility of the sun at Dehra and at Greenwich. At Dehra the percentage of invisibility, since 1881, has averaged from 10 to 22 days, while at Greenwich it was from 41 to 60 days between 1880-81 and 1885-86.

In the Photographic Office, Survey of India, experiments have been made with the object of improving the ordinary process of photozincography by impressing the photographic image directly from the negative instead of transferring it from a paper impression. The results obtained are sharper and more accurate in scale. The process of heliogravure by the etching method, has made great advances, and is now being largely utilised for the reproduction of photographs from nature or other subjects which are unsuited for photozincography, or require finer and more delicate treatment. A large number of the plates illustrating Dr. Führer's forthcoming report on the Archæological Remains at Jaunpur have been reproduced in this manner, and a specimen has also appeared in our "*Proceedings.*" A series of plates, chiefly selected from the drawings executed by the Archæological Surveys, is being reproduced in this manner under the orders of the Government of India, R. and A. Department, for the use of Art Schools throughout the country.

In this country we depend almost entirely on photography for the rapid multiplication of the maps of our Surveys, and other plans and drawings; for we have no Keith Johnstons, nor Stanfords here, and no class of professional engravers, draughtsmen, or lithographers to draw upon, though we hope our Schools of Art will in time supply this deficiency.

It is peculiarly gratifying to me to be able to tell you that the property possessed specially by the eosin dyes, of rendering bromide of silver very highly sensitive to the yellow rays of the spectrum,—a fact which was first announced in this room, in January 1876,—has been turned to useful account in the preparation of the so called orthochromatic, or isochromatic, plates, which have been found of the greatest use in copying paintings and in photo-micrography, photo-spectroscopy and other purposes when it is desired to photograph objects of a yellow colour, which reproduce so unsatisfactorily by the ordinary methods. During the year I commenced a series of observations on the orthochromatic properties of different kinds of eosins and hope, if the pressure of other duties permits, to be able to resume them and to lay them before you with further photo-spectroscopic observations of the less refrangible rays, with the aid of the Rowland gratings exhibited at our last meeting.

Before proceeding further, mention may be made of several mathematical papers by Babu Asutosh Mukhopádhyáy, that have appeared in our *Journal* and *Proceedings*, on Poisson's Integral and on Monge's Differential Equations to the Parabola and to all Conics.

## Museums.

As the founder of the first Museum in this country our Society

should have a peculiar interest, not only in the Imperial Indian Museum, in which its own collections are now preserved, but in the welfare and progress of the Museums which have been established all over the country and are so valuable for the due conservation and study of objects of historical or scientific interest, besides being a most potent means of education by the eye, to the student, or craftsman, as well as to the merest sightseer : and it is satisfactory to think that the poorest cooly can enjoy these advantages gratuitously and without let or hindrance.

*Indian Museum.*—This Museum, in which we have so strong a direct interest, is doing good work in many directions which have been especially noticed under their respective heads. It is a very great pleasure to me to be able to report that the new building to accommodate the Economic and Anthropological Collections, has been commenced, under the orders of the Government of Bengal. When this is completed the Museum will have a magnificent range of buildings worthy of the Imperial capital and Presidency town.

It is specially gratifying to know that the Sea-Dredging operations by the Marine Survey department, in the starting of which our Society took so prominent an interest some years ago, are yielding very fruitful results. The contributions of zoological specimens collected by Commander Carpenter, Dr. Giles—the naturalist, and other officers of the Marine Survey, are steadily increasing in number and importance. According to a summary kindly furnished to me by Mr. Wood-Mason, the Superintendent of the Museum, no less than 515 distinct species, exclusive of the results of numerous surface gatherings and of isolated fragments of Sponges, Hydroids, Alcyonaria, Mollusks &c., were brought on the books of the Museum during the year ; and many specimens, including the fine collection from 20 to 1,900 fathoms formed last May by Mr. Wood-Mason, who temporarily took Dr. Giles' place on board the 'Investigator' as naturalist, are still being sorted and registered. The retirement of Dr. Giles from the Survey, threatened to interfere with the continuity of the zoological work, but it is satisfactory to know that a competent successor to him, in Dr. Alcock, has been appointed by Government, and there is no reason to fear that the results of the present season will be inferior to those of past seasons. It is hoped that with steel dredging-wire, which has been ordered from Europe, results of still greater value and importance will be attained.

The other most important recent acquisitions are a collection of interesting Neolithic worked stones from Southern India, presented by Mr. R. B. Foote ; and the remarkable collection of remains of the same age discovered by Mr. Driver, and referred to elsewhere.

The rough draft of the "Catalogue of Mantodea, with descriptions of new Genera and Species in the Collections of the Indian Museum," referred to by my predecessor last year, has been completed by Mr. Wood-Mason; Part I, which will be illustrated by 30 to 40 woodcuts, is ready for press, and it is hoped will be issued during the current year. Mr. Wood-Mason has also commenced a descriptive catalogue of the extensive collection of the Malacostracous Crustacea.

Mr. W. L. Sclater has been actively continuing the "Catalogue of Mammalia," commenced by Dr. J. Anderson, and has completed the determination and listing of the *Carnivora*, and made considerable progress with the *Ungulata*.

Parts III and IV of a "Catalogue of the Moths of India," by Mr. Cotes and Col. Swinhoe, which was referred to in last year's Address, have been issued, and Part V, (*Pyrales*), completing this useful work, in the preparation of which Col. Swinhoe has had a prominent share, is ready to be issued.

The very important subject of the investigation of the insect-pests of India has received the earnest attention of the Trustees, and, at the suggestion and with the aid of the Government of India in the Revenue and Agricultural Department, has been placed on a systematic footing. Mr. E. C. Cotes has been allowed to devote a portion of his time to collecting information on this subject and publishing the results periodically as "Notes on Economic Entomology" and further to bring into use when practicable the methods and apparatus that have proved successful in dealing with insect-pests in Europe and America. Two numbers of the "Notes" (on the Wheat and Rice Weevil, and on Insecticides) have already appeared; a third (on Indian Insect Pests) is in preparation, and a large amount of material has been collected, which will gradually be worked up with the aid of specialists.

The extensive Zoological collections from the Mergui Archipelago, formed for the Museum by Dr. J. Anderson, F. R. S., while Superintendent, are being described in the Zoological Section of the *Journal of the Linnean Society of London*. In Vol. XXI, No. 131, Mr. S. O. Ridley contributes an account of the *Alcyoniid* and *Gorgoniid Alcyonaria;* Prof. A. C. Haddon describes two new species of *Actiniæ*, and Mr. F. E. Beddard reports on the *Annelids*; Dr. de Man's report on the *Podophthalmous Crustacea* occupies the whole of Vol. XXII, and forms one of the most extensive contributions to the knowledge of the carcinological Fauna of Indian seas that has been published in our time. Papers on the *Mollusca*, by Prof. E. von Martens, and on the *Gephyreans*, by Prof. E. Selenka, have also been published by the Linnean Society during last year.

In the Economic Section good progress has been made by Mr. T. N. Mukharji, the Curator, in rearranging the collections of economic products according to Dr. Watt's 'Dictionary.' Little can, however, be done in properly arranging the various collections in this Section until the completion of the new buildings. Mr. Mukharji has during the year compiled and published a very complete and useful work on the Art Manufactures of India.

*Madras Museum.*—From the Report of the Madras Museum for 1887-88, of which the Director has favoured me with a copy, it appears that the Herbarium was gone systematically through and rearranged by Mr. W. A. Lawson, the Govt. Botanist.

Mr. Thurston, the Director, made two tours to Tuticorin and the Nilgiris. At the former place large collections of marine fauna were made with the assistance of native divers. Large collections of birds, reptiles and butterflies were made on the Nilgiris. The results of these two tours will be published hereafter.

An Art-Gallery has been established. A preliminary report on the marine fauna of Rámeswaram and the neighbouring islands was issued, and an illustrated catalogue of the Batrachians (frogs, toads and coecilians) of Southern India was in the press.

*Jeypore Museum.*—The Jeypore Museum is specially worthy of notice, not only for the completeness with which it has been organised by the munificence of the Maharajah of Jeypore, but for its great success as an educational institution of the highest kind in a part of the country where such results would scarcely be looked for. Dr. T. H. Hendley, the Honorary Secretary of the Museum, to whose exertions much of its success has been due, has favoured me with the latest report of the working of this Museum since its foundation, from which the following brief abstract may be of interest.

The Museum was first founded as a Natural History Museum by the late Maharajah, but this was abolished in 1879, and an Economic and Industrial Museum, was opened temporarily in the city from August 1881 till September 1886, when the collections were removed to the Albert Hall in the Jeypore Public Gardens.

The New Museum was opened in this building in February 1887. The building itself, designed by Col. Jacob, R. E., is replete with copies of the best ornament from the most important edifices in the Indo-Saracenic style at Agra, Delhi, Futtehpur Sikri and Amber. There is also a great deal of original work by students in the local School of Art; sons of Jeypore masons.

It was constructed by local labour, with marbles and other materials, from Rajputana and shews that the indigenous architectural talent

which has raised so many beautiful buildings in all parts of India, almost unsurpassed, even in Western countries, for grandeur of effect on the one hand and delicate intricacy of minute detail on the other, is by no means dead and only requires due encouragement and direction. The new Bori Bunder Railway Station, at Bombay, much of the ornament of which was also worked out by students of the Bombay School of Art is another good example of the same.

The interior is decorated with mural frescoes executed by local artists, comprising copies of some of the most celebrated specimens of Indo-Persian art of the time of Akbar, as well as of characteristic specimens of ancient art in Western and Eastern countries, besides some admirable reproductions of the frescoes at the Ajanta caves. The Japanese and Egyptian frescoes have just been completed.

The collections include metal work from all parts of India, enamels and pottery, carvings in wood, stone, ivory, textiles and all other Indian arts, and in every section choice specimens of European work, in original or copy, have, within the last year, been exhibited for comparison.

As the objects of the Museum are more especially economic and industrial, and space is wanting, no attempt has been made to collect a large number of specimens of stuffed animals, though it is intended to completely illustrate the natural history of Rájpútána. A large number of type collections of minerals and other geological and physiological specimens,—glass and enamel models of the invertebrata—and other models illustrating the higher forms of animal life and illustrative of the structure of plants are to be found here—besides models, maps and other educational appliances. An Art library is in process of formation.

The collections also include a series of economic products which will be classified and numbered in conformity with the system carried out in the Indian Museum and the Imperial Institute.

The Museum is entirely supported by the Durbar, which has spent about a lac of rupees upon it, exclusive of outlay on the building. Since its foundation, in August 1881, it has been visited by upwards of 2,000,000 persons and the number of visitors, averaging a quarter of a million yearly, is increasing.

The above brief abstract will give an idea of the good work that is being done in this comparatively out-of-the-way Native State, and the efforts of all those, by whose munificence and intelligent exertions these results have been achieved, to maintain a high standard of pure native art and promote the higher education of the masses by means of this splendid Museum, deserve our warm sympathy.

*Lucknow Museum.*—From the last report of this Museum, it appears to be making good progress under the energetic management of Dr.

Führer. The presentations, including books, amount to 6,698 items, and this large increase to the collections tends to delay the issue of catalogues. The number of visitors was about 285,820. The most interesting additions to the collections have been in the Archæological section and Coin Cabinet; these are noted elsewhere. A marked feature of the Museum is the department for the sale of art-ware, which appears to be flourishing.

*Colombo Museum.*—The Reports, for 1887, by Mr. A. Haly, the Director, and Mr. F. H. M. Carbet, the Librarian, contain much interesting information regarding the working and progress of this Museum. The principal additions and other points of interest have been noted under their respective heads.

*Phayre Museum, Rangoon.*—This Museum seems to be doing well. As noticed elsewhere, the staff have been chiefly employed in making a complete collection of Burmese entomology. Nothing has been done in other departments of Natural History. There is a good collection of Economic Products, and arrangements are being made to add other local specimens not represented. A collection of Timbers will shortly be made and placed in the Museum. A collection illustrative of the process by which tin is obtained from the ore at Renaung, on the borders of Tenasserim, has recently been added. It is hoped that the Museum will form an essential feature of the proposed Jubilee Memorial Hall.

I regret that I have been unable to obtain any account of the Lahore Museum, which is always obtaining acquisitions of archæological interest.

### Other Institutions and Societies.

*Royal Botanic Garden, Calcutta.*—The Report of the past year shows that this garden is making steady progress under the management of Dr. G. King, F. R. S. Further improvements in the roads and laying out have been carried out. There has been a large demand for *Rheea* fibre and also for seeds and plants of the rain tree. Mahogany and other economic trees and plants have been largely distributed. Trials have been made, in Sikkim, of a special kind of Mexican wheat and of an Abysinnian grain, called Seff (*Eragrostis Abysinnica*), both of which grow at high altitudes, but without success.

The Herbarium, under Dr. D. Prain, has been considerably enriched by many valuable contributions of plants from Burma and the Shan Hills, the Sikkim-Nepal Frontier, the Chittagong Hill Tracts, Kashmir and other parts of India and its borderlands, as well as from foreign countries. The set of plants of the *Euphorbiacæ* have been returned by

Sir J. D. Hooker bearing, in his own handwriting, the names he has given to them in his "Flora of British India." The Library has also received an important acquisition in the correspondence of Wallich, contained in 33 volumes, extending from 1794 to 1849, which has been transferred from the Kew Library.

*Zoological Garden.*—Our Society, as you may recollect, took an active part in the establishment of the Zoological Garden, at Alipore, and it is satisfactory to learn that it is flourishing and continues to attract large numbers of visitors, forming a pleasant place of resort for the Calcutta public, European and native. The past year appears to have been a satisfactory one in every way. The number of visitors to the Garden who paid entrance fees in 1887-88, was 108,041, exclusive of students and children under 8 years of age.

The most important additions to the menagerie during the same period were:—By purchase; two Bactrian camels and three Russian bears, also an Indian and a Javan rhinoceros purchased from the sale of the menagerie of H. M. the late king of Oude. By the acquisition of these valuable and rare animals, the Committee were able to exhibit all the species of Asiatic Rhinoceros side by side. I may also mention that a young rhinoceros has lately been born in the gardens; a fact that is interesting as being very rare, and also because the young one is a hybrid between *R. Sumatrensis* and *R. Lasiotis.* 131 presentations, including 48 mammals, 79 birds and 4 reptiles, were made during the year.

Several improvements have been made and additional accommodation for animals provided, including a snake pit. Additional kiosks for the deer have been erected, and these animals show a greatly improved appearance as the result of their being protected from sun and rain. This is specially conspicuous in the Sambhar, which, as a rule, had always suffered in health and been very subject to skin diseases during the rains; while, during the past season, they have remained throughout in excellent condition. That the animals appreciated their improved accommodation was sufficiently clear from the fact that during the wet weather they were hardly ever to be seen lying down anywhere save on the well-raised masonry floor of their shed. Even though we are within the tropics, proper shelter for animals is necessary, and a new house for tropical birds, in which a proper temperature can be maintained during the cold nights of the winter months, is about to be built. A special secluded den, communicating with the back compartments of the portion of the Carnivora House occupied by the lions, has been constructed. It is only where such accommodation is present that successful breeding of lions in confine-

ment has been achieved, and it appeared to be well worthy of some expenditure to provide it. The Committee propose to establish a 'Schwendler' medal to be given for special services to the gardens.

*Microscopical Society.*—This young Society, which may be hailed as an indication of the newly awakening desire for practical science, has just published its first annual Report and seems to be doing very good work. As stated elsewhere, a Committee has investigated the Mango Weevil, and several papers have been read; two of which, "on *Anopolophrya Æolosomotis*, a new ciliate infusorian parasite", and "on some new forms of *Euplotes*," both by our member Mr. H. H. Anderson, have been presented to the Society and will be published in our *Journal*. Mr. Wood-Mason, who has taken a very active interest in this Society, of which he has just been elected President, contributes a paper "on the Eyes of the *Stomatopoda*." Several other interesting notes have been brought before the meetings.

The *Natural History Society of Bombay*, so far as may be judged from the rapid accession of numbers, now numbering over 400, and the publications issued, appears to be flourishing and to be doing good work. The principal papers that have appeared in its *Journal* are noticed under their respective heads. The newly formed *Anthropological Society of Bombay* also appears to be doing well and now has over 330 members.

The Journal of the *Madras Literary Society* maintains its high standard and contains several papers of general as well as local interest.

### Anthropology and Ethnology.

The Ethnographic Survey of Bengal which was started, under Mr. H. H. Risley's supervision, in 1885, has now been completed and the extensive materials collected are being prepared for publication. The first two volumes of the work, containing the measurements (taken on the French anthropometric system) of nearly six thousand subjects, representing about eighty castes and tribes of Bengal and Northern India, are expected to appear shortly; while two other volumes, forming an ethnographic glossary of the castes, tribes, sects, occupations and other subordinate groups of the people of these Provinces will, it is hoped, be published within the year. Mr. Risley has been invited by the Committee of the Paris Exhibition to take part in the Anthropological Section, and a series of life-size models of representative types of the races of Bengal are now being prepared at the School of Art for exhibition at Paris. This experiment is of special interest as being an attempt to combine artistic effect with the accurate delineation of feature required for scientific purposes. A number of measurements of each subject are taken on the French system, and the model is worked up

in strict accordance with these dimensions, a list of which will be attached to the final castings. If scientific opinion in Europe approves of these figures, it is hoped that some permanent demand may arise which would lead to an extension of the series, and while offering employment to the indigenous modellers, would, at the same time, admirably illustrate the marked diversity of type met with within even the limits of a single Province, and would afford the means for systematic study of Indian ethnology in Europe.

The prehistoric and ancient relics that are being unearthed by Mr. W. H. P. Driver, of Ranchi, in the Neolithic sites discovered by him in that district, are being sent to the Indian Museum for examination and description by Mr. Wood-Mason, who has already contributed a paper on the subject to the Society's *Journal*, illustrated by four plates of arrows and other worked stones. The most interesting of the objects discovered by Mr. Wood-Mason amongst the material sent down by Mr. Driver are the chisel-shaped arrow-heads, similar to those which have been found, still hafted and feathered, in ancient Egyptian tombs, and, sporadically, in several parts of Europe, including the British Isles. The rarity of this type of arrow in collections is probably explained by its simplicity causing it to escape the notice of collectors.

Most of the other communications on this subject in our *Journal* and *Proceedings* have also been contributed by Mr. Driver, and comprise a paper containing "a description of a peculiar custom obtaining amongst the aboriginal tribes of Lohardaga, called 'Era Sendra' or 'women's hunt,'" with the object of expelling the cholera demon, and "Notes on some Kolarian Tribes," published in the *Journal* No. 1, Part I. In this paper Mr. Driver describes the Asurs, who are to be found only in the extreme west of the Lohardaga District and are iron-smelters by profession; also the Birhors, who lead a wild nomadic life in Chutiya Nágpur, travelling about in small communities, and live by making string from the *chop* (*Bauhinia scandens*) bark; and the Kharigas, who are found in the S. W. corner of Lohardaga and the neighbouring states, and in Sambhalpur. They are said to be found also, in a most savage condition, in the Manbhúm and Singbhúm districts.

Another paper, by the same author, "on the aboriginal Tribes of the Paháriyá Hariyás and the Koroas," will be published in the *Journal*, Part II.

Col. Bloomfield contributes a short note on "Copper Celts in the Bálaghát District," to the July *Proceedings*.

Judging from the list of papers received by the Anthropological Society of Bombay, many interesting points connected with anthropology in India are being worked out by its members. Among the most

important of these is a paper, published in June, by Mr. F. Fawcett, on "the Soaras of Ganjam," and among the unpublished papers the following may be mentioned: "Statistics of Suicide in Bombay in 1886 and 1887," "Note on the Bhonde Kumars," "A descriptive alphabetical list of twenty occult Sciences of the Muslims," "Note on the Bundi Devuru ceremony of mutilation in a sub-sect of the Vokalijaru Caste of the Mysore Province," "Note on the minor Vaishnava sects of Bengal."

The Society and the science of anthropology have just sustained a heavy loss in the death of Mr. E. Tyrrell Leith, in Germany. He was the founder of the Society, and had, in an advanced state of preparation, an elaborate work on 'Cannibalism in India.'

The *Madras Journal of Literature and Science* contains a very interesting paper, by Dr. G. Oppert, 'on the Original Inhabitants of Bharatavarṣa, or India,' dealing chiefly with the Dravidians. The *Madras Christian College Magazine*, has a series of papers by Mr. J. Cain on the Kois.

Col. Tanner's report on the Explorations in Bhutan and the Lower Sanpu River, already noticed, contains some interesting notes on the tribes inhabiting Bhutan, and a Chingmi vocabulary.

The *Calcutta Review*, for April, contains a paper, by Mr. J. C. Nesfield, 'on the Musheras of Central and Upper India.'

The Ceylon "*Orientalist*" contains papers, by Mr. H. White, on "Cingalese Folklore" and "Paddy cultivation customs;" by A. T. Shamseddin, "on the ceremonies of child-birth among the Moors of Ceylon;" by C. B Bell "on superstitious ceremonies connected with the cultivation of Alvi, or hill-paddy."

The "*Journal Bombay Branch of the R. A. S.*" contains a paper, by Dastur Darab Pershotan Sanjana, "on the alleged practice of next-of-kin marriages in old Iran."

The *Indian Antiquary* contains contributions by G. T. da Penha, Pattibai D. H. Wadia, and Pandit S. M. Natesa Sastri on "the Folklore of Southern India," and by Mr. Crask, "Notes on the Gipsy tribes of the North-West Provinces and Oudh."

In the "*Proceedings of the Royal Geographical Society*" is a very interesting account, by Mr. Maurice Portman, of the Onges, inhabitants of the Little Andamans, who until very recently appeared to be irreclaimable savages, but have now been conciliated and brought to order. Mr. Portman states, on the authority of Mr. W. Maxwell of Penang, a well-known Malay scholar, that the Malays look on the Andamanese as the Monkey race mentioned in the Rámáyána and had long known them as the Orang Hándoumán, the Islands being called Handoumans.

The *Journal of the Anthropological Society of Vienna* (Vol. XVIII) contains a very elaborate paper by Dr. Moritz Winternitz; "Der Sarpabali, ein Alt-indischer Schlangencult,"—on ancient Indian Snake-worship. Also a paper by Dr. W. Tomaschek—'Die Zinngewinnung und Bronzebereitung in Asien,' with references to the use and working of tin and bronze in various parts of India and Central Asia; and by Dr. Haberlandt, "Die Cultur der Eingeborenen der Malediven," a study of the Maldive Islanders.

In the *Journal of the Geographical Society of Vienna* (XXXI) is a short account of the Nicobarese, by Dr. Sroboda, with a map and figures.

A new work by Dr. F. Max-Müller, "Biographies of Words and the home of the Aryans," deserves notice.

## Zoology.

This is a subject of which my knowledge is so limited that any attempt on my part to put before you the main points of interest in the progress of this widely extended branch of science during the past year in India must necessarily be very imperfect.

The opening up of Upper Burma has already increased our knowledge of its fauna, principally of the birds and lepidoptera, but it is somewhat disappointing to find that so little has been done from India itself to take advantage of the numerous expeditions that have been made into all parts of the country, and that the principal honors are scored by foreigners. However it must be a matter of congratulation that good work has been done in this new country, and it matters not by whom.

Good progress has been made in adding to our knowledge of the fauna of Indian Seas, by the Marine Survey Department under Commander Carpenter, who has enriched our Museum Collections to an unprecedented extent in this direction; while the results are being worked out by Mr. Wood-Mason, who is a specialist in this branch. Mr. Thurston, the Director of the Madras Museum, has also been busily engaged in diving operations off the Southern Coasts and obtained large and interesting collections. Mr. Haly, Director of the Colombo Museum has also done some dredging on the Ceylon coasts. These marine investigations are of special interest in connection with the distribution of animal life and the occurrence of living forms of extinct species now found as fossils.

The progress of the recently-formed Natural History and Anthropological Societies of Bombay shews that a lively interest is taken in Zoological and Anthropological studies on that side of India.

Another advance of great importance in the interests of the

country itself, is the attention which is being paid, under the direction of the Trustees of the Indian Museum, to Economic Entomology, in the investigation of the insect-pests which work so much destruction to food and other crops, and of the means of eradicating them.

Sericulture is another important branch of this subject to which attention has also been given during the year.

*Mammals.*—In our own *Journal* is a description, with two plates, by Mr. O. Thomas, of "*Eupetaurus*, a new form of Flying Squirrel from Kashmir," and Mr. W. T. Blanford contributes "Notes on Indian *Chiroptera*."

At our April meeting Mr. W. L. Sclater exhibited some specimens of *Paradoxurus* which tend to show the impossibility of dividing *P. musanga* into two species, as proposed by Mr. W. T. Blanford, and that the Indian and Burmese forms of Palm-cat are identical.

*The Journal of the Bombay Natural History Society*, contains a paper, by Veterinary Surgeon J. H. Steel, "on the nearest allies to the horse" and "Notes on Sambhur," by Mr. R. Gilbert."

In the *Annals and Mag. Natural History*, our former member and valued contributor, Dr. G. E. Dobson, describes two new species of Indian Soricidæ, *viz.*, *Crocidura leucogenys*, from Ajmir, and *C. Dayi*, from the Madras Presidency.

We have to welcome the appearance of the first part of a long projected and important work on "the Fauna of British India, including Ceylon and Burmah," under the editorship of our esteemed former President, Mr. W. T. Blanford. It is for the present intended to restrict this work to the *Vertebrata* and to complete it in about seven volumes. One volume will be devoted to the *Mammals*, Mr. W. T. Blanford being himself the author; Mr. E. W. Oates has undertaken the preparation of that portion of the work (three volumes) which will be devoted to *Birds;* the *Reptiles* and *Batrachians* will be described by Mr. G. A. Boulenger in one volume; and Dr. F. Day will treat of the *Fishes* in the remaining two volumes of the series. The part which has appeared is a half-volume treating of a portion of the mammals, and the author, Mr. Blanford, is to be congratulated on the very favourable reception accorded to this portion of his work. This account of the mammals of India worthily embodies all the additions to our knowledge of this group since the date of Jerdon's "Mammals." It is profusely illustrated with excellent figures of the animals and of their crania and dentition and will doubtless be much appreciated by Indian naturalists and sportsmen.

*Birds.*—It is satisfactory to find that the Indian Ornithological Journal '*Stray Feathers*' is not yet extinct, although it appears at very

irregular intervals. A number, comprising parts 1 to 4 of the eleventh volume of this work, has lately appeared, and the 353 pages of which it consists are wholly devoted to an account of the Birds of Manipur, Assam, Sylhet and Cachar, by Mr. A. O. Hume, assisted by Mr. J. R. Cripps. Another complete work, devoted to the "Game, Shore, and Water Birds of India," by Col. A. Le Messurier, has been published and is intended mainly for the use of sportsmen in this country. Mr. J. A. Murray continues his "*Avifauna of India*," and has issued two parts of the second volume of his book during the year.

Our own *Journal* contains no notices of birds. The *Journal of the Natural History Society of Bombay* contains two papers by Captain E. F. Becher—"Some cold-weather notes from Guzerat" and "Hot-weather notes in the Central Provinces," which are entirely of ornithological interest. Also papers, by Lieutenant H. E. Barnes, on "Nesting of the Indian *Hirundines*," and "on Nesting in Western India."

The '*Ibis*,' as usual, contains a number of papers, bearing on Indian ornithology. Among these may be noted: Mr. Hargitt's monographic account of the genus *Gecinus*; Mr. Norman's "Note on the Geographical Distribution of the crested Cuckoos"; a letter, by Mr. W. Davison, on "Travancore Birds;" Mr. Whitehead's "Notes on some oriental Birds"; Mr. Sharpe "on two apparently undescribed species of *Sturnus*"; A note by Mr. Seebohm on the Identity of *Ibis propinqua* with *Ibis melanocephala*; "On the Birds of Bhamo, Upper Burmah," in which Mr. E. W. Oates enumerates the species not described in Count Salvadori's paper on the Birds of Upper Burma, published in the *Ann. Mus. Civ. Stor. Nat. Genova*, 2nd series, Vol. IV; "Notes on the Birds of Kashmir and the Drás District, by Lieutenant W. W. Cordeaux; "On *Phasianus torquatus* and its Allies," by Mr. H. Seebohm, describing some Chinese and Central Asian species; "on *Hirundo rustica* and *Motacilla melanope* in Ceylon," by S. Bligh. Count Salvadori's "Birds from Tenasserim," is noticed.

*The Proceedings of the Zoological Society of London*, contain two papers by Mr. R. Bowdler Sharpe, entitled "Notes on Specimens in the Hume Collection of Birds"; also, by the same, "A list of a collection made by Mr. Wray in the main range of Perak, Malay Peninsula," including many Himalayan genera.

Mr. Haly's "Catalogue of Birds in the collection of the Colombo Museum" is in the press.

*Reptiles and Batrachians.* The *Journal of the Bombay Natural History Society* contains papers on the Biscobra, by Mr. G. W. Vidal and Mr. J. A. Da Gama; also a "Catalogue of Snakes in the Society's collections" and a note, from the *Asian*, "on the hearing of Snakes."

In the *Proceedings Zoological Society, London* is a notice of a new snake, *Azemiops Feæ*, found by Sig L. Fea in the Kakhien Hills—Upper Burma. The discovery is important because this snake combines the external characters of a lycodontoid colubrine with the poison-apparatus of a viper. It has a loreal shield, which has hitherto been regarded as indicating the innocuous nature of a snake.

The *Ann. and Mag. Natural History* contains "Description of a new earth snake of the genus *Silybura*, from the Bombay Presidency, with remarks on better known *Uropeltidæ*." By G. E. Mason.

Mr. Haly's report on the Snakes, Lizards and Frogs in the Colombo Museum has appeared.

The *Proceedings of the Zoological Society of London*, contains an interesting paper, by Messrs. Howes and Ridewood, on the limb-skeleton of the tailless Batrachians, and a "note on the classification of the *Ranidæ*," by Mr. Boulenger, who also describes two new Frogs from India—*Rana Leithii*, from Matheran, and *R. himalayana*, from Darjiling —in the *Annals and Magazine of Natural History*.

An illustrated Catalogue of the Batrachians (Frogs, Toads and Cæcilians) of Southern India, already noticed, has been issued by Mr. Thurston, Director of the Madras Museum.

*Fishes.* In the *Proceedings of the Zoological Society, London*, Dr. F. Day, in Part I. of "Observations on the Fishes of India," notes alterations in nomenclature and distribution of species described in his "Fishes of India," and gives some additions.

The *Journal of the Natural History Society of Bombay* contains a continuation of the very interesting papers, by an anonymous author, "On the waters of Western India," which deal chiefly with notes on the fish to be met with and fishing.

*Mollusks.*—Our former member and contributor, Col. Godwin-Austen, has described some land mollusks, including new species, from Burmah and the Andaman and Nicobar Islands, in the *Proceedings of the Zoological Society of London.* The same Journal contains papers by Mr. G. R. Sowerby, on new species of Shells, chiefly from the Eastern Seas, among which is *Malletia angulata*, from the Bay of Bengal.

The *Annals and Magazine of Natural History*, contains "Diagnoses of new species of *Pleurotomidæ* in the British Museum," by Mr. E. A. Smith, with descriptions of Indian and other Asiatic species. Mr. Kirkpatrick describes some *Polyzoa* from the Indian ocean.

This journal also contains a translation of T. Brock's paper on the so-called eyes of *Tridacna*, a huge bivalve mollusk which is amongst the commonest inhabitants of our Indian coral-reefs, and the occurrence of "green cells" in its vascular system.

In the *Journal of Conchology*, Mr. J. Cosmo Melvill gives descriptions of new species of *Pecten* and *Mitra*, including some from the Andamans and other Eastern localities, and of two new *Siphonaliæ* from Japan.

Two parts of Tryon's "Manual of Conchology" have been received in the Library, Vol. IV, 2, (*Helix*), and Vol. X, 2, (*Neritina—Navicella Adeorbis—Cyclostrema—Vitrinella—Teinostoma—Liotia*).

In the *Mémoires de la Société Zoologique de France*, Dr. F. Jousseaume gives a description of the mollusks collected by Dr. Faurot in the Red Sea and the Gulf of Aden. They were mostly collected at Cameran and Obock, and comprise many species common to the Indian Ocean, even as far as Japan and the Philippines. It is noticed that no Mediterranean forms were found in the Red Sea, though in the Suez Canal both forms showed a tendency to advance towards each other. Eastward of Aden forms were found similar to those of Ceylon and the Philippines.

The *Transactions of the Linnean Society* contain the second part of "A monograph of recent *Brachiopoda*," illustrated by 12 beautiful plates by the late Mr. T. Davidson, F. R. S.

*Entomology.*—This ever popular branch of Zoology has made good progress during the year.

In our *Journal* Part II, Mr. E. T. Atkinson continues his notes on Indian *Rhynchota; Heteroptera.*

Papers have been read:—"On new or little-known Butterflies from the Indian Region," by Mr. L. de Nicéville; "The Butterflies of the Nilgiri District," by Mr. G. F. Hampson; and "*Pseudopulvinaria Sikkimensis*," by Mr. E. T. Atkinson. These will be published shortly.

In the Colombo Museum, Mr. Haly reports that manuscript catalogues have been prepared of Butterflies to the end of *Nymphalidæ* and of the Moths to the end of *Bombycoides*. It may be of interest to collectors to know that citronella oil has been found most effective in preserving Entomological specimens from fungus and vermin. For sending specimens of insects to the Museum the plan of placing a layer of napthalene at the bottom of a tin box and then alternate layers of cotton wool and insects has been found to answer well.

A collection illustrative of Burman Entomology is being made in the Rangoon Museum. This collection was commenced in 1885, and now contains nearly 400 named species of butterflies and over 500 kinds of moths, also named, besides a number of undetermined forms. Many of these Lepidoptera have been named by our member Mr. de Nicéville, and by Col. Swinhoe. The former has described three new species in our Journal, *viz.*, *Papilio noblei* ♂, *Hesperia cephaloides*

♂ and *Parnara uma* ♀. Several moths are awaiting identification by Col. Swinhoe. Difficulty is experienced in having the other orders named. Only a very few of the *Hemiptera* and *Hymenoptera* have been identified and none of the others, of which considerable numbers have been collected.

The *Journal of the Bombay Natural History Society* contains "Notes on a collection of Butterflies made in Burmah in 1885 and 1886," by Lieut. E. Z. Watson; "Hints on collecting Hymenoptera," and "on some Bees and Wasps from Burmah," by Captain C. T. Bingham; "On the Lepidoptera of Karáchi and its neighbourhood, Part II, by Col. C. Swinhoe; "Butterflies and Ants," by L. de Nicéville.

*The Annals and Magazine of Natural History* contains several papers on Entomology among which may be noted :—Mr. W. L. Distant's description of new species of Oriental *Cicadidæ*, preparatory to the issue of his monograph on the Oriental *Cicadidæ*, of which the first part will appear this year at the expense of the Trustees of the Indian Museum. Mr. A. G. Butler's papers, on Butterflies of the genus *Teracolus* from Khandesh, and on three collections of Lepidoptera made by Major Yerbury in Upper India. Mr. C. O. Waterhouse's "descriptions of new species of the Coleopterous families *Lucanidæ*, *Cetoniidæ*, and *Buprestidæ* from South India." "Descriptions of new Genera and Species of *Lepidoptera Heterocera*," from the Kangra District, by F. Moore. Mr. C. J. Gahan gives descriptions of some new Indian species of Longicorn Coleoptera," comprising *Monohammus auratus*, *M. bimaculatus*, *M. griseatus*; also of Lamiide Coleoptera belonging to the *Monohammus* group, containing new Indian and Asiatic species; and of a new species of the Longicorn genus *Cyriocrates*, *(C. elegans)* from Upper Burma; Mr. Pascoe describes some new *Curculionidæ*, chiefly Asiatic.

In the *Transactions of the Entomological Society of London* are papers by Mr. A. G. Butler on the lepidopterous genus *Euchromia*, of which he describes some new species from the Oriental and Austro-Malayan regions. Mr. Elwes' valuable "Catalogue of the Sikkim *Rhopalocera*" is enriched with additions and corrections and notes on the seasonal and local distribution by the late Mr. Otto Müller. Mr. W. L. Distant contributes to our knowledge of Oriental *Rhynchota*, including some species from Sikkim sent to him by Mr. E. T. Atkinson. Prof. Westwood contributes notes on the life-history of various species of the neuropterous genus *Ascalaphus*, founded chiefly on Ceylonese material communicated to him by Mr. J. Staniforth Green of Colombo; Mr. F. Merrifield reports progress in Pedigree Moth-breeding to the end of 1887. Mr. C. O. Waterhouse communicates additional observations on the Tea-bugs of the genus *Helopeltis*, which play such havoc amongst the tea-bushes in this and other countries where tea is grown.

The *Transactions of the Linnæan Society* contain two parts of the Rev. A. E. Eaton's valuable monograph of Recent *Ephemeridæ*, or May-flies, illustrated by two plates of very careful drawings.

Turning to Foreign Journals :—

In the *Berliner Entomologische Zeitschrift*, as well as in the *Verhandlungen der K. K. zoologisch-botanischen Gesellschaft*, in Vienna, and the *Tijdschrift voor Entomologie*, of the Dutch Entomological Society, at the Hague, are valuable articles by Professor Schaufuss on the little known families *Pselaphidæ* and *Scydmænidæ*. Several butterflies from the Austro-Malayan and Malayan regions are described by Dr. E. G. Honrath, who, also with Dr. H. Dewitz, notices the rare *Papilio cacicus* in the *Deutsche Entomologische Zeitschrift*. The Iris Society, in Dresden, publishes an interesting essay by Dr. E. Haase, "on the odoriferous apparatus in the Indo-Australian Lepidoptera," and Mr. J. Röber describes some new Indian butterflies.

*Economic Entomology.*—The work done in this direction in the Indian Museum has already been noticed. The *Journal of the Agri-Horticultural Society of India* contains an interesting paper, by Mr. W. J. Simmons, on the Mango Weevil (*Cryptorhynchus mangifera*). This weevil has been further investigated by a Committee of the Microscopical Society, which, although unsuccessful in ascertaining how this pest gains access to the fruit, found that, unlike some of the fruit-infesting weevils, it passed its larval and pupal stages in the fruit and only quits it as a perfect insect, and they obtained a good deal of other information regarding this and other pests infecting the mango. In the same Journal Mr. Cotes describes the work of the United States Entomological Commission, which has been so successfuly carried out under Professor Riley.

*Arachnidans.*—The *Journal of the Bombay Natural History Society* contains an interesting notice by the Rev. Fr. Dreckmann, with a note by Mr. Wood-Mason, and a collotype plate from life, of the simultaneous Twin Parturition of *Buthus afer*, the Black Rock-Scorpion ; also a paper by Mr. E. W. Oates ; "on the Indian and Burmese Scorpions of the genus *Isometrus*, with descriptions of three new species."

*Crustaceans.*—In our own *Journal*, No. IV, part 2, for 1887, Mr. Wood-Mason, who has done so much in establishing the sea-dredging operations of the Marine Survey on an efficient basis, and in working out the results, gives a description of a new species of the Brachyurous genus *Lyreidus* from the depths of the Andaman Sea, obtained by Commander Carpenter, R. N., of the Indian Government Marine Survey Steamer, "Investigator;" and in No. 3 of 1888, Dr. Giles, the naturalist to the Survey, gives "Further notes on the *Amphipoda* of Indian waters." Dr. De Man's valuable report on the Podopthalmous Crustaceans from the Mergui Archipelago has already been noticed.

*Echinoderms.*—In the *Proceedings of the Zoological Society*, Professor F. J. Bell gives a "Report on a collection of *Echinoderma* made at Tuticorin, Madras," by Mr. E. Thurston, Director of the Madras Museum.

In the *Annals and Magazine of Natural History*, Dr. M. Duncan has a valuable paper on "the anatomy of the *Temnopleuridæ*, a family of regular *Echinoidea*.

*Rhizopods.*—In a paper in the latter journal on the structure and affinities of the Genus *Parkeria*, Dr. H. A. Nicholson states, and promises in a future paper to show, that the genus *Syringosphæra*, of Duncan, is a Hydrocoralline nearly related to the recent genera *Allopora* and *Sporadopora*. Dr. Th. Studer, of Berne, describes some new species of the Alyconarian genus *Spongodes*. Mr. H. J. Carter contributes a description of a large variety of *Orbitolites Mantelli*, Cart., from the Irrawaddy, also papers "on the Foraminiferal genus *Orbitoides* of d'Orbigny;" "on the organic and inorganic changes of *Parkeria*," and other papers of interest.

## Bacteriology.

The forthcoming number of the "Scientific Memoirs by Medical officers of the Army in India" contains an interesting paper in which Dr. Douglas Cunningham deals with the special work relating to cholera carried out in the Laboratory attached to the office of the Sanitary Commissioner with the Government of India, and the conclusions arrived at in it, as the result of experimental investigation of the behaviour of comma bacilli under various circumstances, are that, even if it be granted that the bacilli really are the cause of cholera, they cannot be regarded as in themselves efficient causes for the occurrence of epidemic diffusion of the disease, and that the really important factors securing this must be in special conditions of locality. The practical importance of this in relation to the question of Quarantine *versus* Local Sanitary Improvement is self-evident.

In connection with this important subject mention may be made of a paper entitled "an enquiry into the causation of Asiatic Cholera," communicated to the Royal Society of Edinburgh by Drs. McLeod and Miller, both of Shanghai, in which the authors, after a series of careful experiments, arrive at the conclusion that there is strong evidence for regarding the comma bacillus of Koch as the cause of Asiatic Cholera.

## Botany.

In systematic Botany, the chief Indian publication of the year has been the second and final part of Dr. George King's exhaustive "Mono-

graph of the Species of *Ficus* of the Indo-Malayan and Chinese countries,' which forms the first volume of the new *Annals of the Royal Botanic Garden, Calcutta*. It deals with the *Synoecia*, *Sycidium*, *Covellia*, *Eusyce* and *Neomorphe*, and is fully illustrated with plates which have been excellently lithographed by students of the Calcutta School of Art. Dr. King proposes to issue a supplement dealing with the new species recently collected by Mr. H. O. Forbes in New Guinea, and containing an "account of the fertilisation of *Ficus Roxburghii*," by Dr. D. D. Cunningham. A similar monograph of the genus *Quercus*, by the same author, the commencement of which was noticed by my predecessor last year, is rapidly approaching completion, and will probably be issued during the current year.

In the department of Physiological Botany several most interesting memoirs have been published by Dr. D. D. Cunningham. The chief of these gives an account of an elaborate series of researches into the causes of the movement in the sensitive plant; the result amounting almost to a demonstration that these are to be found rather in mechanical arrangements of the fluids in the tissues, than in any vital or nervous force originating in the cell protoplasm. This research appeared in the volume of *Scientific Memoirs by the Medical officers of the Army of India* which was issued by the Surgeon General for the year just ended. In the same volume Dr. Cunningham also describes a new genus of *Ustilagineæ* and a curious Alga entophytic in the leaves of the pretty floating water-weed so common in Bengal—*Limnanthemum indicum*, and Dr. James Tomes, gives an interesting account of the way in which flies visiting the flowers of *Wrightia coccinea* are entrapped and killed.

The forthcoming number of the same publication contains two botanical papers:—Dr. D. D. Cunningham gives a series of notes on the life history of two species of *Ravenelia*, a genus of the *Uredineæ*, regarding which very little was previously known beyond the mere morphological characters of certain of the reproductive elements. A paper, by Dr. Barclay, is also occupied with details of the life-history of another Uredine, a new species of *Cœoma* occurring in the Simla Hills, on *Smilax aspera*, Linn., and characterised by the very peculiar character of its æcidial fructification and the abnormal form of germination of the teleutospores, the promycelia breaking up directly into sporidia, in place of giving origin to the latter through the intervention of sterigmata.

Dr. Barclay has also contributed to our Journal a "Descriptive List of the *Uredineæ* occuring in the neighbourhood of Simla," illustrated with plates.

A paper, by Mr. H. F. Blanford, giving a List of the Ferns of Simla, between levels of 4,500 and 10,500 feet, was read at the May meeting of our Society and will be published immediately.

Dr. Prain has just completed his monograph on the Indian *Pedicularis*, noticed in last year's 'Address,' and has presented it for publication by our Society.

General Collett, C. B. has continued his collection of the plants of the Shan Hills under his command, and among other novelties has discovered a new rose. The Botany of these hills having hitherto been as obscure as their economical and political condition, General Collett's collections are of much interest. A detailed account of them will soon be published.

In the *Journal of the Bombay Natural History Society* the following botanical papers may be noted. "Note on *Vigna vexillata*," by the Rev. A. G. Cane, in which he describes the ingenious contrivances by which the fertilisation of the flowers is secured. Brigade-Surgeon W. Dymock continues his papers on "Maráthi names of Plants" and also contributes an interesting paper on "the means of self-protection possessed by plants." Dr. K. P. Kirtikar's Lecture on the "Folklore of Indian plants," though not botanical, is of interest as containing tales and legends connected with many of our best known trees and plants.

In an interesting paper on the "conditions for the distribution of plants and the means by which it is performed, with special regard to Indian species," Mr. G. Cartensen discusses the special means of protection possessed by various members of the Indian flora against heat, drought, and other climatic and meteorological influences affecting them. Mr. M. H. Starling gives a description of the difficulties which attend growing ferns from spores, and the best way of overcoming them.

A very full account of the Botany of the Afghan Delimitation Commission, by Dr. J. E. T. Aitchison, C. I. E., the naturalist attached to the Mission, has been published in the *Transactions of the Linnean Society* for 1888. The author describes the physical features and accompanying vegetation met with in the course of the Mission through Northern Baluchistan, the valleys of the Helmund, Harut and Hari Rud rivers, the Badghis district, Mount Do-shakh and Khorasan, and gives an enumeration of the plants.

The *Journal* of the same Society (*Botany*) contains a "Revision of the Genera *Microstylis* and *Malaxis*," by H. N. Ridley, in which reference is made to several Indian species of *Microstylis*.

In the *Journal of Botany*, I find some notes by Col. Beddome on Ferns from Manipur, Perak and Penang.

Mr. J. F. Duthie, the Director of the Botanical Department North-

ern India, has made interesting botanical collections at Quetta and the Khojak Pass, also at Khandwa, in the Central Provinces, and he accompanied the Black Mountain Expedition as botanist. The results of these tours have not yet been worked out. Much of his attention has been given to the planting of the *Usar* reserves with trees likely to thrive on saline soils, and he was most successful with the paper-mulberry *(Broussonetia papyrifera)* which seems to thrive better on such soils than anything which has been previously tried. This plant yields a valuable fibre and is also useful as a fodder plant. Large numbers of plants of the rain-tree *(Pithecolobium saman)*, which is likewise a valuable fodder-plant, have been issued, also for planting on *Usar* land, from the Royal Botanical Garden, Calcutta.

The cultivation of the date-palm in India has been encouraged by the distribution of seed obtained from the Persian Gulf, Egypt and from Tunis.

One of the most important developments of Economic Botany in this country is certainly the growth of Cinchona for the production of quinine. Mr. Gammie's report on the working of the Government Cinchona Plantation, near Darjiling, shows that important progress has been made there during the last year, under Dr. G. King's superintendence. The new process of preparing the sulphate of quinine from the bark has already been noticed. The old red bark, or Cinchona febrifuge-yielding plants, are being steadily replaced by the *Calisaya ledgeriana* and hybrid varieties which yield quinine. Attempts to naturalise the species of Cinchona which yield the hard Carthagena and cuprea barks, have been unsuccessful, but three new South American varieties of *calisaya*,—*verde*, *morada* and *zamba morada*,—sent out in 1883, have been cultivated with success. Though fanciful as to soil and situation, they are quick and sturdy growers, and the quality of the bark yielded by them seems little inferior to that of *ledgeriana* : their introduction appears, therefore, likely to be one of the most important and promising experiments ever tried at the Plantation.

The *Indian Forester* contains papers on " The Influence of Forests on Rainfall," by Dr. D. Brandis, and " The Nilgiri *Strobilanthes*," by Mr. J. S. Gamble ; besides notes on Resins, Bamboos &c., which are interesting on the side of Economic Botany.

The *Journal of the Agricultural and Horticultural Society* contains a valuable note by Dr. Warden on *Erythoxylon Coca* grown in India, with an appendix containing reports of the cultivation of the plant in various places. The chemical results have already been noticed.

In the same *Journal* is a note, by Dr. D. Prain, on " Lokao ; the Chinese green dye yielded by various species of *Rhamnus*."

The Government of Madras have recently issued an interesting "Monograph on the Cocoanut Palm *(Cocos nucifera)*," by Dr. J. Short.

This review, brief and incomplete as it is, has, I fear, far exceeded the ordinary limits of an Annual address, but will, I trust, be sufficient to show that the 'record of work done,' in India, during the past year has been a remarkably good one and fruitful in subjects of interest and importance.

The President announced that the Scrutineers reported the result of the election of Office-Bearers and Members of Council to be as follows :—

*President.*

Lieut.-Col. J. Waterhouse, B. S. C.

*Vice-Presidents.*

E. T. Atkinson, Esq., B. A., C. S.
Rájá Rájendralála Mitra, LL. D., C. I. E.
J. Wood-Mason, Esq.

*Secretaries and Treasurer.*

Dr. A. F. R. Hoernle.
W. King, Esq., B. A., D. Sc.

*Other Members of Council.*

D. Waldie, Esq., F. C. S.
H. M. Percival, Esq., M. A.
E. Gay, Esq., M. A.
H. Beveridge, Esq., C. S.
A. Pedler, Esq., F. C. S.
A. Simson, Esq.
Dr. J. Scully.
Pandit Haraprasád Shástri, M. A.
Dr. D. D. Cunningham.
Hon. Sir A. W. Croft, K. C. I. E., M. A.
Prince Jahán Qadr Muhammad Wáhid Ali Bahádur.
The Hon. Mr. Justice Wilson.
Bábú Gaurdás Bysack.

The meeting was then resolved into the Ordinary General Meeting.

Lieut.-Col. J. Waterhouse, President, in the Chair.

The Minutes of the last Meeting were read and confirmed.

Twenty-seven presentations were announced, details of which are given in the Library List appended.

The following gentlemen, duly proposed and seconded at the last Meeting of the Society, were ballotted for and elected Ordinary Members.

Babu Surendranath Ráy, B. L.
C. Little, Esq., M. A.

The following gentlemen are candidates for election at the next Meeting.

Col. H. R. Thiullier, R. E. (for re-election) Surveyor General of India, proposed by Lt.-Col. J. Waterhouse, seconded by Dr. Hoernle.

Surgeon D. Prain, M. A., M. B. Curator of the Herbarium, Royal Botanical, Garden, Sibpur, proposed by, Lt.-Col. J. Waterhouse seconded by Dr. G. King.

Tom. D. La Touche, Esq., B. A. (Cantab) Geological Survey Department, proposed by E. J. Jones, Esq., seconded by J. Wood-Mason, Esq.

Bhupendra Sri Ghosha, B. A., proposed by J. Wood-Mason, Esq., seconded by Lt.-Col. J. Waterhouse.

John Mann, Esq., M. A., Bengal Education Department, proposed by Sir A. W. Croft, seconded by C. H. Tawney, Esq.

Major A. W. Jamieson, S. C., 7th Bengal Infantry, Saugor, C. P., proposed by W. L. Sclater, Esq., seconded by Dr. W. King.

Bábú Jagannáth Khunnah, proposed by Bábú Gaurdás Bysack, seconded by Dr. Hoernle.

Bábú Hanuman Prasad, Rais, Chunar, proposed by Lt.-Col. J. Waterhouse, seconded by Dr. Hoernle.

W. H. Jobbins, Esq., Principal, Government School of Art, Calcutta, proposed by J. Wood-Mason, Esq., seconded by E. T. Atkinson, Esq.

The following gentlemen have expressed a wish to withdraw from the Society.

H. M. Kisch, Esq., C. S.
Kumar Saratchandra Sinha.

The Secretary reported the death of the following Member:

Otto Möller, Esq.

and that the election of the following gentleman had been cancelled

under Rule 9, as he had not paid his admission fee and first quarter's subscription.

Nawab Mir Mahomed Ali, proposed by Bábú Gaurdás Bysack.

The SECRETARY read the following Circular letter from the Royal Academy of Sciences of Turin, offering for competition the seventh Bressa Prize of the value of 12,000 Italian lire.

"The Royal Academy of Sciences of Turin, in accordance with the last will and testament of DR. CESARE ALESSANDRO BRESSA and in conformity with the Programme published December 7th, 1876, announces that the term for competition for scientific works and discoveries made in the four previous years 1885-88, to which only Italian Authors and Inventors were entitled, was closed on December 31st, 1888.

The Academy now gives notice that from the 1st of January 1887 the new term for competition for the seventh BRESSA Prize has begun, to which, according to the testator's will, scientific men and inventors of all nations will be admitted. A prize will therefore be given to the scientific Author or Inventor, whatever be his nationality, who during the years 1887-90 "according to the judgement of the "Royal Academy of Sciences of Turin, shall have made the most impor- "tant and useful discovery, or published the most valuable work on "physical and experimental Science, Natural History, Mathematics, "Chemistry, Physiology and Pathology, as well as Geology, History, "Geography and Statistics."

"The term will be closed at the end of December 1890.

"The value of the prize amounts to 12,000 Italian lire.

"The prize will in no case be given to any of the National Members of the Academy of Turin, resident or non-resident."

*The President of the R. Academy,*
A. GENOCCHI.

*Turin, January 1st*, 1889.

The PHILOLOGICAL SECRETARY exhibited some coins presented by the Bombay Branch, Royal Asiatic Society, and Mr. W. Sandford, and read the following reports on finds of Treasure Trove Coins:

1. Report on 152 silver coins of old mintage, forwarded by the Collector of Sarun with his No. 1380G, dated 21st December, 1888.

The coins are stated to have been found as long ago as the 9th February, 1887, in the Mouzah Kowa, Pargáná Koodi, Subdivision Gopálganj of the Sarun District; and to have been acquired for Government at an approximate valuation of Rs. 188-1-6.

They belong to the following Mughal emperors of Delhi:

| | | No. of specimens. |
|---|---|---|
| I. | Muḥammad Sháh, A. H. 1131—1161 = A. D. 1719—1748; type: *Bádsháh Ghází;* mint: Muḥammadábád-Banáras, 'Aẓímábád; legible dates 1148, 1152, 1154, 1159, 1160 ..... | 9 |
| II. | Aḥmad Sháh Bahádur, A. H. 1161—1167 = A. D. 1748—1754. | |
| | *a*, Variety I, with date in top-line; mint: Muḥammadábád-Banáras, legible dates 1161[3], 1162, 1163, 1164[5], 1166 ..... | 15 |
| | *b*, Variety II, with date in bottom-line; mint: 'Aẓímábád, symbol on reverse Nos. 28 or 39, on plate XLVI, in Princep's Useful Tables; dates 1162[3], 1163, 1164, 1166, 1169 (the last wrong for 1166, as the regnal year is given 6) ..... | 8 |
| III. | 'Álamgir Ẓání, A. H. 1167—1173, A. D. 1754—1759; | |
| | *a*, Type: *'Álamgír Ẓání;* variety I, with date in top-line, right side; mint: Muḥammadábád-Banáras; legible dates 1168, 1169[2], 1171[3], 1172 ..... | 53 |
| | *b*, Variety II, with date in top-line, middle; mint: Muḥammadábád-Banáras; date of all 1171... | 15 |
| | *c*, Variety III, with date in bottom-line; mint: 'Aẓímábád; dates 1168[3], 1169[3], 1170, 1171[2]. | 9 |
| IV. | Sháh 'Álam, A. H. 1173—1221, A. D. 1759—1806; | |
| | *a*, Variety I, thick piece, with date on bottom-line; mint: Muḥammadábád-Banáras; legible dates: 1177[7], 1178[3], 1179[3] ..... | 16 |
| | *b*, Variety II, thick piece, with date on top-line, mint: Muḥammadábád-Banáras; dates illegible, except partially 11** on one ..... | 19 |
| | *c*, Variety III, broad piece; mint: 'Aẓímábád (with symbol No. 28, as above): legible dates 1177[1], 1178[1] ..... | 8 |
| | Total ... | 152 |

2. Report on 3 silver coins of old mintage, forwarded by the Collector of Sarun, with his No. 1382G, dated 21st December, 1888.

These coins are stated to have been found by a person of Kho-

waspore, Pargana Poroi, Subdivision Sewan, District Sarun, and to have been acquired for Government for Rs. 3-11-6.

They belong to the following two Paṭhán emperors of Delhi:

| | No. of specimens. |
|---|---|
| I. Islám Sháh, A. H. 952—960 = A. D. 1545—1552; one specimen, dated 960, resembling No. 359 in E. Thomas' *Chronicles* | 1 |
| II. Muḥammad 'Ádil Sháh, A. H. 960—964 = A. D. 1552—1556; two varieties: | |
| *a*, one like No. 365 in E. Thomas' *Chronicles*, dated 961; margin illegible | 1 |
| *b*, one specimen, differing from the preceding only in the omission of *'Ádil* from the obverse legend; date 961 | 1 |
| Total ... | 3 |

3. Report on 148 copper coins of old date forwarded by the Deputy Commissioner of Sialkoṭ, with his No. 1926, dated 21st December, 1888.

These coins are stated to have been found near the village of Vadalla in the Sialkoṭ district, while digging a grave.

The whole of the coins, with the exception of two, appear to belong to the well-known type of "Horseman and Bull" with the *Sámanta Deva* legend over the Bull. But they are in a too bad state of preservation to determine to which of the many species of that type the several coins may belong.

Of the two exceptions, above referred to, one is quite illegible. The other is a coin of Saifuddín Muḥammad Qutlagh, showing on the obverse a Persian inscription encircling a horse, while the reverse face bears a Hindí legend. This kind of coin has been described and figured in Prinsep's Indian Antiquities (ed. E. Thomas), Vol. I, pp. 37, 343, (plate II, fig. 14 and plate XXVII, fig. 27, 28).

4. Report on 57 old copper coins, forwarded by the Deputy Commissioner of Balaghat, with his No. 4214 of the 7th December, 1888, and No. 26 of the 2nd January, 1889.

These coins are stated to have been found at the village of Pandiwara, within the limits of the Police Station House at Waruseoni in the Balaghat District.

They are square copper coins of the kings of Malwah, and are of two different types:—

*a.* One type appears to have the Muhammadan creed on one side, and the king's name on the other; but they are not in a sufficiently good condition to determine the name with certainty; it appears, however, to be Muḥammad, who reigned in 818—839 A. H. = 1434—1455 A. D.; no dates legible; No. of specimens ... 19

*b.* The other type would seem to belong to Maḥmúd bin Náṣir Sháh, who reigned from 916—937 A. H. = 1510—1530 A. D. Some show faint traces of dates, apparently, 916, 917, 930; No. of specimens ..... 38

Total ... 57

Dr. Hoernle exhibited a large coloured genealogical tree illustrating the chronology of the Jain religion, and all its divisions and subdivisions, prepared by Muni Átmárám Jí Ánanda Vijay Jí,—

Also 4 gold Gupta coins forwarded by Mr. Rivett-Carnac, and a unique gold coin of the Bengal Sulṭán Jalálu-d-dín Fatḥ Sháh, an account of which will be published in the Journal, Part I.—

Also read a letter from Bábú Hanumán Prasáda, Rais, of Chunar, and exhibited photographs and copies of inscriptions taken from the sculptures found in the newly discovered rock temple in the Fort of Chunar, forwarded by the Rais.

The following papers were read:—

1. *Diagnoses of new Indian Pediculares.—By* Surgeon D. Prain, *Curator of the Herbarium, Royal Botanical Garden, Sibpur. Communicated by* Dr. G. King.

2. *Note on some ancient burial grounds in the Lohardagga district.—By* W. H. P. Driver, Esq.

These papers will be published in full in the Journal, Part II.

## Library.

The following additions have been made to the Library since the Meeting held in January last.

### Transactions, Proceedings and Journals,

*presented by the respective Societies and Editors.*

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Notulen, Deel XXVI Aflevering 3.

Bombay. Anthropological Society of Bombay,—Journal, Vol. I, No. 5.
———. The Indian Antiquary,—Vol. XVII, Part 215, December, 1888, Part I.
Budapest. La Société Hongroise de Géographie,—Bulletin, Tome XVI Nos. 7 et 8.
Calcutta. Geological Survey of India,—Records, Vol. XXI, Part 4.
———. Indian Engineering,—Vol. V, Nos. 1—5.
———. The Indian Engineer,—Vol. VI, Nos. 14—18.
Chicago Ill. The American Antiquarian and Oriental Journal,—Vol. X, No. 6, November, 1888.
Copenhagen. K. Nordiske Oldskrift-Selskab,—Aarboger, Raekke II Bind. III, Hefte 3.
Havre. Société de Géographie Commerciale du Havre,—Bulletin, Novembre—Décembre, 1888.
Ithaca. Cornell University,—Library Bulletin, Vol. II, No. 8, November, 1888.
London. Nature,—Vol. XXXIX, Nos. 999—1002.
———. Society of Telegraph Engineers and Electricians,—Journal, Vol. XVII, No. 75.
———. The Academy,—Nos. 868—871.
———. The Athenæum,—Nos. 3191—3194.
Moscow. La Société Impériale des Naturalistes de Moscou,—Bulletin, No. 3, 1888.
———. Meteorologische Beobachtungen, Das Jahr 1888—Erste Hälfte.
Paris. La Société D'Anthropologie de Paris,—Bulletin, Tome. XI (3e série), No. 3.
———. La Société de Géographie,—Bulletin, Tome. IX, No. 3.
Rome. La Societá Degli Spettroscopisti Italiani,—Memorie, Tome XVII, Dispensa 10a 11a.
St. Petersburg. La Société Impériale Russe de Géographie,—Journal, Tome. XXIV, No. 3.
Stettin. Entomologischen Vereine Zu Stettin,—Entomologische Zeitung, Jahrgang XLIX, Nrn 10—12.
Sydney. Linnean Society of New South Wales,—Proceedings, Vol. III (2nd series), Part 3.
Toronto. Canadian Institute,—Proceedings, Vol. VI (3rd series), No. 1.
Vienna. Der Anthropologischen Gesellschaft in Wien,—Mittheilungen, Band. XVIII, Heft. 4.
———. Des K. K. Naturhistorischen Hofmuseums,—Annalen, Band, III, Nr. 3.

## Books and Pamphlets,

*presented by the Authors, Translators, &c.*

Tarkálankára, Mahámahopádhyáya Chandrakánta. Kaumudi-Sudhákara A Prakarana. 8vo. Calcutta, 1888.

————. Kusumánjali. 8vo. Calcutta, 1888.

Thornton, F du Pre. Elementary Arabic, Part I. 8vo. London, 1888.

## Miscellaneous Presentations.

A Report from the Librarian of the Bodleian Library, Oxford, 1882-87, and previous history of the Library. 4to. Oxford, 1888.

Bodleian Library, Oxford.

Hydrographic Notice No. 1 (1888). Andaman Islands. 8vo. Bombay, 1888.

Commander A Carpenter, R. N.

Description of the Oudh and Rohilkund Railway Bridge across the Ganges at Benares, opened by His Excellency the Viceroy, Lord Dufferin, in December 1887, and called the "Dufferin Bridge." 4to. Lucknow, 1887.

A. Constable, Esq.

Report on the Administration of the Central Provinces for the year 1887-'88. Fcp. Nagpur, 1888.

Chief Commissioner, Central Provinces.

General Report on Public Instruction in Bengal for 1887-'88. Fcp. Calcutta, 1888.

Notes on the annual statements of the Charitable Dispensaries under the Government of Bengal for the year 1887. Fcp. Calcutta, 1888.

Report on the Administration of Bengal, 1887-'88. Fcp. Calcutta, 1889.

Report on the Rail-borne traffic of Bengal during the year 1887-'88. Fcp. Calcutta, 1888.

Report on the River-borne traffic of the Lower Provinces of Bengal, and on the Inland trade of Calcutta, and on the trade of Chittagong and the Orissa Ports, with notes on Road-traffic for the year 1887-'88. Fcp. Calcutta, 1888.

The Fauna of British India, including Ceylon and Burma. Mammalia. By W. T. Blanford, F. R. S. 8vo. London, 1888.

The Indian Forester, Vol. XIV, Nos. 11 and 12, November and December, 1888. 8vo. Roorkee, 1888.

Government of Bengal.

Final Report of the Royal Commission appointed to enquire into the

recent changes in the relative values of the Precious Metals; with Minutes of Evidence and Appendices. Fcp. London, 1888

Return of all Loans raised in England under the provisions of any Acts of Parliament, chargeable on the Revenues of India, outstanding at the commencement of the Half-year ended on the 30th September, 1888. Fcp. London, 1888.

Selections from the Records of the Government of India, Home Department, No. 247. Reports on publications issued and registered in the several provinces of British India during the year 1887. Fcp. Calcutta, 1888.

Government of India, Home Department.

Epigraphia Indica and Record of the Archæological Survey of India, Part I. 4to. Calcutta, 1888.

Government of India, Rev. and agri. Dpt.

Annual Report on the Lunatic Asylums in the Madras Presidency for the year ending December 1887. Fcp. Madras, 1888.

Report on the Administration of the Madras Presidency during the year 1887-'88. Fcp. Madras, 1888.

Government of Madras.

Report on the Administration of the Panjab and its dependencies for 1886-'87. Fcp. Lahore, 1888.

Government of the Punjab.

Ládilichandra-prakásha, Bramanhastava and Gopálsúkta (3 Sanskrit works bound in one vol.). 8vo. Benares.

Babu Mohini Lall Gupta.

Report of the Eleventh Annual Meeting of the Indian Association for the Cultivation of Science, Calcutta, held in April 1888. 8vo. Calcutta, 1888.

Indian Association for the Cultivation of Science.

Return of Wrecks and Casualties in Indian Waters for the year 1887, Fcp. Calcutta, 1888.

Port Officer, Calcutta.

Proceedings and Transactions of the Royal Society of Canada for the year 1887, Vol. V. 4to. Montreal, 1888.

Royal Society of Canada.

Anuario del Observatorio Astronómico Nacional de Tacubaya. Año de 1889. 8vo. Mexico, 1888.

Secretaria de Fomento, México.

Tide Tables for the Indian Ports for the year 1889 (also January 1890). 8vo. London, 1888.

Survey of India, Tidal and Levelling Operations.

## Periodicals Purchased.

Braunschweig. Jahresbericht über die Fortschritte der Chemie un verwandter Theile anderer Wissenschaften,—Heft. 3, 1886.

Calcutta. Calcutta Review,—Vol. LXXXVII, No. 175, January, 1889.

———. Indian Medical Gazette,—Vol. XXIII, No. 12, December, 1888.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome. XX, No. 12.

Leipzig. Annalen der Physik und Chemie,—Sachregister, Band 1—CLX; Ergänzungsband I—VIII und Jubelband 1824—1877.

———. ———. Beiblätter, Band. XII Stück. II.

London. Mind,—Vol. XIII, No. 53, January, 1889.

———. The Chemical News,—Vol. LVIII, Nos. 1517—1520.

———. The Nineteenth Century,—Vol. XXV, No. 143, January, 1889.

———. The Society of Arts,—Journal, Vol. XXXVII, Nos. 1883—1886.

Paris. Revue Scientifique,—3$^{e}$ série, Tome. XLII, Nos. 24—26, et Tome XLII, Nos. 1 et 2.

## Books Purchased.

Subdakalpadruma, Vol. II, Nos. 28 and 29. 4to. Calcutta, 1888.

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

FOR MARCH, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th March 1889 at 9 P. M.

LIEUT.-COL. J. WATERHOUSE, President in the Chair.

The following members were present:

H. Beveridge, Esq., Bábú Gaurdás Bysack, E. C. Cotes, Esq., Dr. A. Crombie, E. Gay, Esq., S. A. Hill, Esq., Dr. G. King, Professor C. R. Lanman, C. Little, Esq., Kumár Rameswár Máliah, Bábú Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., A. Pedler, Esq., T. A. Pope, Esq., W. L. Sclater, Esq., Pandit Haraprasád Shástri, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Forty four presentations were announced as detailed in the Library List appended.

The following gentlemen duly proposed and seconded at the last meeting of the Society were ballotted for and elected Ordinary Members.

Col. H. Thuillier, R. E., (re-elected).
Surgeon D. Prain, M. A., M. B.
Tom D. La Touche, Esq., B. A., (Cantab.).
Bhupendra Sri Ghosha, B. A.
John Mann, Esq., M. A.
Major A. W. Jamieson.
Babu Jaganáth Khunnah.
Babu Hanuman Prasad, Rais.
W. H. Jobbins, Esq.

The following gentleman is a candidate for election at the next meeting :

Bábú Goneschandra Chandra, proposed by Bábú Gaurdás Bysack, seconded by Dr. Hoernle.

The following gentleman has expressed a wish to withdraw from the Society :

A. P. MacDonell, Esq., C. S.

The PRESIDENT announced that as Dr. Hoernle had resigned the officiating General Secretaryship, the Council had elected Mr. C. Little a Member of Council and General Secretary ; and that Messrs. Meugens and King had been appointed Auditors of the Society's accounts for 1889.

The SECRETARY read the names of the following gentlemen who had been appointed by the Council to serve on the several Committees during the year.

FINANCE AND VISITING COMMITTEE.

E. T. Atkinson, Esq.
E. Gay, Esq.
Bábú Pratápachandra Ghosha.
Rájá Rájendralála Mitra.
A. Pedler, Esq.
Dr. J. Scully.

LIBRARY COMMITTEE.

Nawáb Abdul Latif Bahádur.
E. T. Atkinson, Esq.
H. Beveridge, Esq.
Bábú Gaurdás Bysack.
Sir Alfred Croft.
Dr. D. D. Cunningham.
E. Gay, Esq.
Bábú Pratápachandra Ghosha.
Prince Jahán Qadr Muhammad Wáhid Ali Bahádur.
J. Mann, Esq.
Rájá Rájendralála Mitra.
Bábú Asutosh Mukhopádhyáy.
Mahámahopádhyáya Mahesáchandra Nyáyaratna.
A. Pedler, Esq.
Hon. Dr. Mahendralál Sarkár.
W. L. Sclater, Esq.
Dr. J. Scully.
C. H. Tawney, Esq.

PHILOLOGICAL COMMITTEE.

Nawáb Abdul Latif Bahádur.
E. T. Atkinson, Esq.
H. Beveridge, Esq.
J. Beames, Esq.
C. J. Lyall, Esq.
J. Mann, Esq.
Rájá Rájendralála Mitra.
Bábú Nilmani Mukerjee.

Bábú Gaurdás Bysack.
Dr. A. Führer.
G. A. Grierson, Esq.
F. S. Growse, Esq.
Bábú Pratápachandra Ghosha.
Col. H. S. Jarrett.
Maulaví Khudá Baksh Khán Bahádur.
Mahámahopádhyáya Maheśáchandra Nyáyaratna.
Pandit Haraprasád Shástri.
Hon. Sir Sayid Ahmad.
Bábú Rajkumar Sarvadhikári.
C. H. Tawney, Esq.
Dr. G. Thibaut.
Col. A. C. Toker.

### Coins Committee.

Dr. A. Führer.
Rájá Rájendralála Mitra.
J. H. Rivett-Carnac, Esq.
C. J. Rodgers, Esq.
Dr. J. Scully.
V. A. Smith, Esq.

### History and Archæological Committee.

Syud Amir Ali.
J. Beames, Esq.
H. Beveridge, Esq.
Bábú Gaurdás Bysack.
W. H. P. Driver, Esq.
Bábú Pratápachandra Ghosha.
Mahámahopádhyáya Kavirája Shyamaldás.
Rájá Rájendralála Mitra.
Dr. A. Führer.
F. S. Growse, Esq.
J. H. Rivett-Carnac, Esq.
Capt. R. C. Temple.

### Natural History Committee.

H. H. Anderson, Esq.
E. T. Atkinson, Esq.
Dr. A. Barclay.
E. C. Cotes, Esq.
Dr. D. D. Cunningham.
J. F. Duthie, Esq.
Dr. G. M. Giles.
E. J. Jones, Esq.
Dr. G. King.
C. S. Middlemiss, Esq.
L. de Nicéville, Esq.
Dr. Fritz Noetling.
R. D. Oldham, Esq.
S. E. Peal, Esq.
Dr. J. Scully.
W. L. Sclater, Esq.
Col. C. Swinhoe.

### Physical Science Committee.

P. N. Bose, Esq.
Bábú Gaurdás Bysack.
Dr. D. D. Cunningham.
J. Eliot, Esq.
C. S. Middlemiss, Esq.
Bábú Asutosh Mukhopádhyáy.
Dr. Fritz Noetling.
R. D. Oldham, Esq.

S. R. Elson, Esq.
Dr. G. M. Giles.
S. A. Hill, Esq.
E. J. Jones, Esq.
Rev. Father Lafont.
J. J. D. La Touche, Esq.
A. Pedler, Esq.
Hon. Dr. Mahendralál Sarkár.
Dr. J. Scully.
Dr. W. J. Simpson.
D. Waldie, Esq.

The Philological Secretary exhibited a silver Bactrian coin and two gold Indo-Scythian coins, forwarded by Mr. A. Simson.

The following papers were read—

1. *Notes on a Buddhistic Monastery at Bhotebagan (Howrah), on two rare and valuable Tibetan MSS. discovered there; and on Puran Gir Gossain, the celebrated Indian Áchárya, and Government Emissary at the Court of the Tashi Lama, Tibet, in the last century.*—*By* Babu Gaurdás Bysack, (postponed from last meeting).

Opposite to Calcutta on the right bank of the river, in the village of Ghusari, behind a range of temples, stands a two-storied house of worship of an old construction partaking of a Tibetan character, and having no arches in any part of it.

The locality is called *Bhotbágán*, the structure *Bhotmandir* or *math*, and its priest *Bhot Gosain*. Among noticeable objects here are various deities of the Hindu and of the Tibeto-Buddhistic* mythology, worshipped together within the math, and a Tibetan Dungten like cubiform *Samádhi mandir* or tomb surmounted by Siva's Phallus, and sheltered within a low-roofed small room having a Bengali inscription on its door-top. The following questions arise from a cursory examination of the place :—

What is the origin, and what the history of this Buddhistic temple so near Calcutta? How Hindu gods and goddesses with those of Tibet receive joint worship? Who was Puran Gir Gosain Mohant, described on his tomb with all the veneration of an apotheosized being, claiming worship and honour from Hindus, Musalmans and other religionists?

From the Sanads and a Tibetan Passport produced by the present Mohant, Umrao Giri Gosain, the following facts have been gathered.

Warren Hastings granted to Teshu Lama, the great sovereign pontiff of Tibet, rent-free lands in the village of Ghusari on the riverside, for the establishment of a house of worship in 1774 and 1783 and, the Lama, in his turn at the same time, granted the same lands to Puran

* *Tará, Mahákálabhairava, Sambhara Chakra, Samája Guhya,* and *Vajrabhrukuti.*

Gir Gosain, famous for his piety and the confidence he enjoyed of the Tibetan authorities. He died in 1795 and was buried as a saint near his *Math.*

The dates give a clue for research into the histories, official reports and other records of the time, whereby a solution of the questions raised has been arrived at, and many interesting incidents connected therewith have come to light.

The Teshu Lama, sovereign of Teshu Lumbo and the guardian of the infant Delai Lama of Lhassa, at the entreaty of Debjudhar, chief of Bhutan who had invaded Kuchh Behar and was defeated by a British force, addressed an intercessory letter to Warren Hastings in 1773 and intrusted it to Puran Gir Gosain as his envoy.

This Sanyási, towards the end of March 1774, delivered his credentials to the first Governor-General and laid before him the Lama's presents, which included "talents of gold and silver, bulses of gold dust and bags of genuine musk."

The keen-sighted statesman with a desire to oblige the Lama in the interest of Tibeto-Bengal trade, complied with his request and sent, under the guidance of Puran, the well-known Bogle Mission to the court of Teshu Lumbo, where the Lama expressed his desire to have a place in the neighbourhood of Calcutta, and on the banks of the Ganges, to which he might send his people to pray. He wished to build a monastery there, leaving its details to be settled by Puran Gir. The reason assigned by the Lama was that although in the different periods of his reviviscence, he had chosen many regions for places of his birth, yet Bengal was the only country in which he had been born twice, for which he had a predilection for it beyond any other, and was desirous of making it a place of his abode.

Warren Hastings accordingly got a piece of land purchased and assigned to the Teshu Lama. The *Bhotmandir* was founded on this site, and its construction was commenced under the direction of Mr. Bogle, who had been previously entrusted by the Lama with a considerable remittance in money. As soon as it was completed, it was filled with the idols which, together with their precious adornments, the Lama had taken care to send down.

The public services which the now-forgotten Puran Gir Gosain had rendered both to the British and the Tibetan Government in the last century were most remarkable. His work began when as a young Sanyási of twenty-five years of age, he came down as the Lama's envoy to meet the Governor-General of India; he next accompanied and guided Mr. Bogle as the head of the first British Mission to Tibet, and interested himself in the cause of Tibeto-Bengal trade; he joined the Lama in his

unfortunate journey to the Court of the Chinese emperor, kept a careful and interesting itinerary of it, and supported the advocacy of the honest Lama in bringing about friendly relations between the Pekin Court and the Bengal Government: he returned to Bengal with the Tibetan Regent's Mission, conveying the melancholy intelligence of the Lama's death in 1781, from small-pox, in the neighbourhood of Pekin, and succeeded in maintaining the friendly relations between the two Governments; he accompanied the Turner Mission in 1783, which Hastings had organised by seizing the occasion of a condolence, as well of congratulation on the appearance of an incarnation of the deceased Lama of which he had been apprised by the Teshu Lumbo Court, and helped Captain Turner in obtaining the establishment of an extended commercial intercourse so far as the assent of the Regent could grant it; and lastly he was himself made the accredited agent of Hasting's Government to the regenerated Teshu Lama's Court in 1785, in which capacity he proved his ability, honesty and devotion in the same way as on former occasions. With this last service of Puran Gir, terminated the series of Missions which Hastings successively sent to the Cis and Trans-Nevean States.

It will be seen that the establishment of the Bhotbágán, and the despatch of the Tibet missions with which it is intimately connected owe their origin mainly to the conciliatory policy of Hastings, to the mysterious doctrine of Lama incarnations, and to the faithful service of a Sivite Sanyási.

The personal history of this remarkable ascetic has been gathered from the traditions of the Bhotbágán. He was a Brahmana and a *dandi*, and a follower of Sankaráchárya's teachings, he was a young man when he went to Tibet, had fair features, was tall, strong and sinewy, and was a good rider (as stated also by Bogle and Turner). He possessed remarkable intelligence and wisdom and was master of many languages, including Tibetan and Mongolian, a wide range of experience acquired by travel in and out of India, a practical insight into all the commercial relations of Asia, of which Tibet formed the heart, and enjoyed and deserved a reputation for piety and integrity which made him the trusted Agent of the Lama and of the British Government.

After his return from Tibet in 1785, he finally settled himself in his Bhotbágán *Math*, where he spent his time in pious observances and deeds of charity and hospitality, which it was the wish of the Lama he should attend to, specially towards the Tibetan pilgrims, for whom he had built guest-houses. He had also an agency business there, directed to help the traders or their people from Tibet in disposing of their wares and making purchases. Gold in large quantities was one of the principal articles which came from Tibet.

Thus he lived piously, usefully, and happily in this retreat for about a decade, enjoying the veneration of people who came into contact with him, and the high esteem of the Bengal Government. The Governor-General, it is said, used to visit him in his *math.*

A terrible catastrophe soon happened which cut short his happy and useful life. The fame of Bhotbágán as a storehouse of the richest gold had spread far and wide, a band of dakaits burst one night into the Monastery and began to plunder it. Our Puran Gir nothing daunted, kept the robbers at bay by the dexterous use of his sword, fought for awhile, then fell overpowered and senseless, pierced with the thrust of a *sarki* or bamboo spear. The dakaits took no further notice of him, made good their plunder and decamped. The sad news was conveyed to the Governor-General who lost no time in sending a Surgeon to help the Gosain, but the victim of violence after lingering for a while, breathed his last. The Government was not remiss in tracing out the dakaits. A short enquiry led to the vindication of justice, and four robbers expiated their guilt on the gallows erected on the Bhotbágán itself.

Daljit Giri, the successor of Puran in the Mohantship, lost no time in performing the funeral rites of his Guru, and buried him in the tomb already described. The worship of the motley group of Hindu and Buddhistic deities in the *math* follows from the peculiar form of Buddhism in Tibet under Tántrik influence, some meagre information regarding which can be gathered from the reports of Bogle and Turner, but upon which fuller light is being thrown by recent researches.

The Bhotbágán *Math* now remains a solitary monument of the genius and of a special policy of the first Governor-General of India, of the piety of Teshu Lama as exhibited in Bengal, of the work of Puran Gir, and of the Tibeto-Bengal trade which flourished centuries ago, and was restored, though in a stifled form, a hundred years ago.

Great and powerful are the ties which bind Tibet to Bengal; the religious associations, the traditions, and remembrance of ancient commercial intercourse, should attract the Tibetans to Bengal. If the policy of the first administrator of India had been only continuous, our Government could by this time have enjoyed its best results.

The paper will be published in full in the Journal, Part I.

2. *Description of a stag's head allied to* Cervus dybowskii, *procured from the Darjeeling Bazaar.—By* W. L. Sclater, Esq., *Deputy Superintendent Indian Museum.*

The paper will be published in the Journal, Part II.

3. *On a small collection of Mammals procured by the Museum Collector at Sháhpur in the Panjab, under the supervision of Dr. G. Henderson.*—*By* W. L. Sclater, Esq., *Deputy Superintendent, Indian Museum.*

The following is an account of a small collection of Mammals made by the Museum Collector at Sháhpur in the Panjab under the supervision of Dr. G. Henderson. The collection consists of 18 specimens, 4 skins and 14 specimens preserved in spirit, belonging altogether to 5 species. Sháhpur is a civil station situated on the Jhelum River just south of the Salt Range; all the animals are typical Panjab desert Forms, with the exception perhaps of *Vulpes bengalensis.*

1. *Vulpes bengalensis*, (Shaw.)

One pair a ♂ and ♀ of this the common Indian Fox not differing in any way from the ordinary Indian form; it would have been expected that the fox of Sháhpur would have been *Vulpes leucopus* of Blyth, which in the opinion of Mr. Blanford does not differ specifically from *Vulpes griffithii* and *pusillus.*

2. *Herpestes auropunctatus*, Hodgs.

One specimen, a male.

3. *Erinaceus collaris*, Gray and Hardwicke.

One specimen of this hedgehog, a male.

4. *Scotophilus pallidus*, Dobson.

Nine specimens, of which three are males and six females, all in spirit. These specimens agree with the type of the species in the Museum collection very well, except that they are somewhat larger and also that the colouration of the Sháhpur specimens is somewhat darker; this may possibly be accounted for by their being fresher specimens.

This species can be at once distinguished from *Scotophilus temminkii*, the common Indian species, by its tragus, which in *Scotophilus pallidus* is smooth and obtusely truncated, whereas in *Scotophilus temminkii* the tragus is traversed by a transverse ridge and is acutely pointed.

The species appears somewhat rare; there appears to be only one specimen in the British Museum, and there are only 4 including the type in the Indian Museum.

5. *Mus bactrianus.*

One adult and four immature specimens all in spirit. This appears to be the common mouse of the Punjab.

4. *On Clebsch's transformation of the Hydrokinetic Equations.*—*By* Babu Asutosh Mukhopádhyáy, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to point out, how the method of applying Clebsch's transformation to obtain a first integral of the hydrokinetic equations of Euler in the case of general rotational motion may be materially simplified by means of Laplace's solution of linear partial differential equations of the first order. It is also incidentally pointed out that the three cases of irrotational motion, steady rotational motion and general rotational motion, may be worked out by one uniform method.

The paper will be published in full in the Journal, Part II.

5. *Notes on the Founder and the Founding of Calcutta, with photographs and tracings of plans of the Town in* 1753.—*By* T. R. Munro, Esq.

Mr. Munro afterwards exhibited and explained some old tracings of a Map of Calcutta, dating from 1753, and photographs of plans now in the British Museum of the above date, and also one supposed to have been drawn in 1723 or 1724—

6. *On a difficult passage in the Rigveda.*—*By* Professor C. R. Lanman, *Harvard College, Cambridge, U. S. A.*

The paper will be published in the Journal, Part I.

## Library.

The following additions have been made to the Library since the Meeting held in February last.

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*presented by the respective Societies and Editors.*

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Bombay. Bombay Branch of the Royal Asiatic Society,—Journal, Vol. III, No. 4.

———. The Indian Antiquary, Vol. XVIII, Part 217, January, 1889.

Brisbane. Royal Society of Queensland,—Proceedings, Vol. V, Part 4.

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Budapest. La Société Hongroise de Géographie,—Bulletin, Tome. XVI, Fasc IX—X.

Calcutta. Indian Engineering,—Vol. V, Nos. 6—9.

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Dresden. Des Entomologischen Vereins "Iris" zu Dresden—Correspondenz-Blatt, Nrn 1—5, 1884—1888.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. IV, No. 12, December, 1888, Vol. V, No. 1, January 1889, and Index to Vol. IV.

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Havre. Société de Géographie Commerciale du Havre—Annuaire, Janvier 1889.

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Mexico. La Sociedad Cientifica "Antonio Alzate,"—Memorias, Tomo. II, No. 5.

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———. L' Académie Nationale des Sciences, Belles-Lettres et Arts de Bordeaux—Actes, 1886.

———. La Société de Geographie,—Compte Rendu des Seances, Nos. 16 et 17, 1888 Nos. 1—3, 1889.

———. La Société Zoologique de France,—Bulletin, Tome. XIII, Nos. 8 et 9.

———. Musée Guimet,—Annales, Tome. XIII.

———. ———. Revue de l'Histoire des Religions, Tome. XVII, No. 3 et Tome XVIII, No. 1.

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Shanghai. China Branch of the Royal Asiatic Society,—Journal, XXIII (new series), No. 1, January, 1888.

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Vienna. Der K. K. Géologischen Reichsanstalt—Verhandlungen. Nrn. 15—18, 1889, Nr. 1, 1889.

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*presented by the Authors, Translators, &c.*

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———————. Das Gṛhyasaṃgrahapariçishṭa des Gobhilaputra (separatabdruck aus der Zeitschrift der Deutschen Morgenländischen Gesellschaft. Bd. XXXV). 8vo. Leipzig.

Bloomfield, Professor Maurice. Final *a s* before Sonants in Sanskrit (Reprint from the American Journal of Philology, Vol. III, No. 1). 8vo. Baltimore, 1882.

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———. On Certain Irregular Vedic Subjunctives or Imperatives (Reprint from the American Journal of Philology, Vol. V, No. 1). 8vo. Baltimore, 1884.

———. On the position of the Váitána-Sútra in the literature of the Atharva-Veda—(Proceedings of the American Oriental Society, October, 1884). 8vo.

———. Seven Hymns of the Atharva-Veda (Reprint from the American Journal of Philology, Vol. VII, No. 4). 8vo. Baltimore, 1886.

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Chief Commissioner, Central Provinces.

The Ten-year Book of Cornell University. II. 1868-1888. 8vo. Ithaca, New York, 1888.

Cornell University, Ithaca.

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The Indian Forester, Vol. XV, Nos. 1—2, January and February, 1889. 8vo. Roorkee, 1889.

GOVERNMENT OF BENGAL.

Appendix to Final Report of the Royal Commission appointed to enquire into the recent changes in the relative values of the precious metals. Minutes of Evidence &c. Fcp. London, 1888.

A Manipuri Grammar, Vocabulary, and Phrase Book, to which are added some Manipuri proverbs and specimens of Manipuri correspondence. By A. J. Primrose, C.S. 8vo. Shillong, 1888.

A short account of the Kachcha Naga (Êmpêo) Tribe in the North Cachar Hills, with an outline Grammar, Vocabulary, and illustrative sentences. By C. A. Soppitt. 8vo. Shillong, 1885.

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Outline Grammar of the Shaíyâng Miri Language, as spoken in the neighbourhood of Sadiya, with illustrative sentences, Phrase-Book, and Vocabulary. By J. F. Needham. 8vo. Shillong, 1886.

Outline Grammar of the Kachári (Bårå) Language, as spoken in the Darrang district, Assam, with illustrative sentences, notes, Reading Lessons, and a short Vocabulary. By Rev. S. Endle. 8vo. Shillong, 1884.

Outline Grammar of the Angāmi Nāgā Language, with a Vocabulary and illustrative sentences. By R. B. McCabe, C. S. 8vo. Calcutta, 1887.

Papers relating to the Expedition against certain Tribes inhabiting the Black Mountain. Fcp. London, 1888.

Sketch of the Geology of the Punjab, 1880-'84. By H. B. Medlicott, 8vo. Calcutta, 1888.

The Diary of William Hedges, Esq., during his Agency in Bengal; as well as on his voyage out and return Overland (1681-1687). Vols. I-II. (Hakluyt Society.) 8vo. London, 1887.

The Voyage of François Pyrard, of Laval, to the East Indies, the Maldives, the Moluccas and Brazil; translated into English from the third French edition of 1619, and edited with notes by Albert Gray. Vol. I. (Hakluyt Society.) 8vo. London, 1887.

GOVERNMENT OF INDIA, HOME DEPT.

Report on the Meteorology of India in 1887. By John Eliot, M. A. Fcp. Calcutta, 1889.

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Dr. E. Hultzch's progress report of the Archæological Survey of Southern India for October and November 1888. Fcp. Lahore, 1889.

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Die Völker des Ural und ihre sprachen. Vortrag in der Ungarischen Geographischen Gesellschaft. von Paul Hunfalvy. 8vo. Budapest, 1888.

Magyar Tudományos Akademia, Budapest.

Parsee Prakash, being a record of important events in the growth of the Parsee community in Western India, chronologically arranged from the date of their immigration into India to the year 1860 A. D. Compiled by Bomanjee Byramjee Patell, Vol. I. 4to. Bombay, 1888.

Dinshaw Manockjee Petit.

Bulletin of Miscellaneous Information, 1888. 8vo. London, 1888.

Royal Gardens, Kew.

Twenty-fourth Annual Report of the Sanitary Commissioner with the Government of India, 1887. Fcp. Calcutta, 1889.

Sanitary Commissioner with the Govt. of India.

Catalogus Codicum Arabicorum, Bibliothecae Academiae Lugduno-Batavae; Editio Secunda, Volumen Primum. 8vo. Batavia, 1888.

Recueil de Textes Relatifs à L'Histoire des Seldjoucides. Par M. Th. Houtsma. Vol. II. Histoire des Seldjoucides de l' Irâq, par al-Bondârî d' après Imâd ad-dîn al Kâtib al Isfahânî. 8vo. Batavia, 1889.

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Prodromus of the Zoology of Victoria. Decade XVII. By Frederick McCoy, C. M. G., M. A., Sc. D., F. R. S. 8vo. Melbourne, 1888.

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———. Zeitschrift für Ethnologie,—Jahrgang, XX, Heft 4 and 5.

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———. Literarisches Centralblatt,—Nrn. 46—52, 1888 und Nrn. 1—3, 1889.

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London. The Annals and Magazine of Natural History,—Vol. II (6th series), No. 12, December, 1888; and Vol. III (6th Series), No. 1, January, 1889.

———. The Chemical News,—Vol. LIX, Nos. 1521—1525.

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———. The Ibis,—Vol. I (6th Series), No. 1.

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———. The Nineteenth Century,—Vol. XXV, No. 144, February, 1889.

———. The Numismatic Chronicle,—Vol. VIII (3rd Series), Part 3, 1888.

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———. Journal des Savants,—Novembre et Décembre, 1888.

———. Revue Critique d' Histoire et de Litterature,—Tome XXVI, Nos. 45—52, et Tome XXVII, Nos. 1 et. 2.

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Philadelphia. Manual of Conchology,—Vol. X, Part 3 and Vol. IV, (2nd Series), Part 3.

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Lubbock, Sir John. On the Senses, Instincts, and Intelligence of Animals, with special reference to insects (The International Scientific Series, Vol. LXV). 8vo. London, 1889.

Report on the Scientific Results of the Voyage of H. M. S. "Challenger"—Zoology, Vol. XXVIII, Vol. XXIX Text (1st and 2nd halves) and Plates to Vol. XXIX. 4to. London, 1888.

Sabdakalpadruma, Vol. II, Nos. 28—29. 4to. Calcutta, 1888.

Sachau Dr. Edward, C. Alberuni's India, English edition, with notes and indices. Vols. I—II, (Trübner's Oriental Series). 8vo. London, 1888.

The Encyclopædia Britannica, 9th Edition, Vol. XXIV. Ura—Zym. 4to. Edinburgh, 1888.

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

FOR APRIL, 1889.

The monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd April 1889, at 9.15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present:

H. Beveridge, Esq., Bábú Gaurdás Bysack, W. Criper, Esq., Dr. A. Crombie, E. Gay, Esq., Dr. Hoernle, W. H. Jobbins, Esq., Rev. Father Lafont, C. Little, Esq., Kumár Rameswár Máliah, R. D. Mehta, Esq., Bábú Asutosh Mukhopádhyáy, Pandit Pránnáth Sarasvati, Kumár Devendra Náráyan Roy, Pandit Haraprasád Shástri, C. H. Tawney, Esq., D. Waldie, Esq., J. Wood-Mason, Esq.

The minutes of the last meeting were read and confirmed.

Eighteen presentations were announced, details of which are given in the Library List appended.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for, and elected an Ordinary Member:

Bábú Gones Chandra Chandra.

The following gentlemen are candidates for election at the next meeting:

Rev. J. Muir Hamilton, proposed by J. Wood-Mason, Esq., seconded by C. Little, Esq.

Maulvi Dilawar Hossain Ahmad, B. A., (for re-election), Deputy Magistrate Gya, proposed by Maulvi Golam Surwar, seconded by Maulvi Kabir-uddin Ahmed.

Hon. Justice Gurudás Banerji, M. A., D. L., proposed by Babu Gaurdás Bysack, seconded by Lieut.-Col. J. Waterhouse.

The following gentleman has intimated his wish to withdraw from the Society:

Bábú Tara Prosad Chatterjee.

The PRESIDENT announced the presentation by T. R. Munro, Esq., of two enlarged photographs, framed, of plans of Calcutta, one from drawings made in 1723 or 1724 showing the palisaded enclosure within which the Christian community resided, and the other from a survey of the town made in 1753 by Lieut. Wills, in command of the Artillery in Bengal.

Also the receipt from Count Landberg, Secretary General of the Congress, of copies of the Programme of the eighth International Congress of Orientalists, to be held at Stockholm and Christiania in September next, with a request that they might be distributed amongst the members of the Society—and stated that Monsieur Senart had been asked to represent the Society at the Congress.

The PRESIDENT exhibited some photographs of the red end of the spectrum from C to Z taken with Rowland's plane and concave diffraction gratings and said:—

In November 1875, I exhibited to the Society some photographs of the red end of the spectrum about A and a short distance below it, obtained on dry collodio-bromide of silver plates stained with anilin blue and given a momentary exposure to white light before being acted on by the spectrum. In these photographs, however, it was noticeable that under the influence of the red as well as of the blue rays the image of the spectrum was strongly reversed, *i. e.*, instead of being a photographic negative it was a positive showing the lines as dark lines on a clear ground. The photographs now before you are on gelatine dry plates stained also with a blue dye, but they show no traces of this reversal in any part of the spectrum, and not only extend much further into the infrared region, but show infinitely better definition and greater dispersion in this part of the spectrum owing to the employment of gratings in place of prisms.

The dye I have used for staining these plates is Alizarin Blue ($C_{17}$ $H_9$ $NO_4$), the quinoline of Alizarin. It is prepared from nitro-alizarin by heating it with glycerine and sulphuric acid, and is found in commerce as a paste insoluble in water and only slightly so in alcohol. It dissolves in liquor ammonia with a greenish-blue colour. By mixing the paste with a concentrated solution of sodium bisulphite the dye

dissolves and when dried forms a dark purple powder, known as Alizarin Blue S or Anthracene Blue. In this form it is readily soluble in water, the solution in distilled water being at first of a brownish orange colour, turning blue on exposure to air. By keeping a few days the colour forms a floculent precipitate, and is then only partially soluble in dilute ammonia.

Examined with the spectroscope solutions of the dye do not give a very marked absorption spectrum.

The plain orange solution of Alizarin S in distilled water absorbs the violet, blue and green up to about *b*.

The greenish-blue ammoniacal solution absorbs the red, orange and yellow very strongly down to about D $\frac{1}{2}$ E., with a general lowering all over the spectrum. There are no distinct absorption bands. I do not find any marked difference in the absorption spectra of the ammoniacal watery solution of three samples of the dye in my possession.

I. Alizarin Blue paste, from the Elberfeld Factory, formerly F. Baeyer and Co.

II. Alizarin Blue S, from the Badische Anilin and Soda Fabrik.

III. Anthracene Blue, from Dr. Schuchardt of Görlitz.

In his work "*Practische Spectral Analyse Irdischer Stoffe*," Dr. H. W. Vogel gives two very different absorption spectra for the ammoniacal watery solutions of pure alizarin blue and of Anthracene Blue, also obtained from Schuchardt; the first agrees with my observations—but the second, which shows maximum absorption between D and E, does not.

The photographs now exhibited have for the most part been taken with No. II, but others have been taken with Nos. I and III. The effect of all of them seems very similar, but further trials are required to ascertain which is best.

The plates I have used have been the ordinary commercial gelatine dry plates. Wratten's 'Instantaneous' have perhaps given me the best results, but the 'Ordinary' have also proved wonderfully sensitive under the action of the dye. The plates are stained by bathing them for one or two minutes in a solution of the dye in distilled water in the proportion of 1 part of the dye to 10,000 parts of distilled water, with 1% of strong solution of ammonia added. The solution has at first a strong greenish tint, but this soon changes to blue and I have noticed that after a time it again takes a greener tint.

With a small spectrograph on Dr. Vogel's principle, consisting of a Browning pocket spectroscope attached to a camera in front of a single element of a small Steinheil aplanatic lens (the addition of this lens is, I find, a great improvement to the instrument as originally proposed by Dr. Vogel) the spectrum obtained on the stained plates shows very

intense action through the violet and blue regions as far as b: from E to C there appears to be a minimum of action, and then it rises again with clearly marked bands of increased sensitiveness between C and A, strongest between C and B and a to A. Below A the sensitiveness quickly diminishes.

I have found the sensitiveness to red differ considerably on plates prepared at different times and have not yet discovered to what this due. With a screen of deep ruby glass in front of the slit, the sensitiveness to red becomes very marked and the maximum sensitiveness is found between D and A, the remainder of the spectrum being either cut off at D, or showing only slight traces of action from F to H, according to the length of exposure.

On a plate taken, about 8·30 A. M. on the 19th March, with the plane Rowland grating in the first order spectrum, using a deep ruby glass screen, exposing 10 minutes, the slit being ·02 millim., the sensitive action in the red commences just below D, and seems gradually to increase to A, then diminishing to about λ 8,000, beyond which lines are distinctly visible, beyond the Z group, up to about λ 8,400. Considering that these photographs have been taken without any special appliances for securing the transmission of the infra red rays, it is probable that with them a much greater extent of the infra red spectrum might be photographed on plates stained with this dye.

With the concave grating also, using a deep ruby glass screen, I have been able to obtain lines in the infra red region to about λ 8,300 with much greater dispersion and distinctness than the plane grating will give. The photograph I have with me shows the spectrum from C to A and below. It is taken on a Wratten's 'Ordinary' plate, a slow kind which unstained would show no action beyond E. It is unfortunate that the sensitiveness of the plates falls off so much just below A, so that the infra red spectrum has not sufficient density to print well, although up to A the image shows too much density for the lines to print clearly. The various photographs, however, serve to show the value of the dye as a ready and simple means of photographing the spectrum from C to A. with ordinary dry plates.

Using plates stained with a special preparation of quinoline blue (cyanin) and sulphate of quinine, Mr. J. C. Burbank has been able to photograph the infra red rays from A to λ 9,900, or to about the limit of Cape Abney's latest map, which was prepared from photographs made on collodion plates containing a greenish form of bromide of silver specially sensitive to the infra red rays. I have tried cyanin prepared in this manner and found that though it is undoubtedly sensitive to the infra red rays, its maximum sensitiveness is between D and B and between B and A its action is much weaker than that of alizarin blue.

The cyanin and quinine solution, however, is troublesome to prepare and neither it nor the plates keep well; moreover the dye is expensive, so that some more simple and more certain stain is desirable, and if alizarin blue, which chemically is allied to cyanin, can take its place for such observations it will be an advantage. I may mention that it has already been tried by Schiendl and Eder, but they do not appear to have recognised its great sensitiveness for the red rays, which is not so apparent with prism spectroscopes as with gratings and requires the use of yellow or red screens to produce its full effect.

Dr. Eder has recommended cœrulein as a sensitiser for the red rays, but though it certainly is useful, the maximum of effect is produced between D and B, while with alizarin blue it is between C and A. I have also found it uncertain in its action, but hope to make further trials of it with the gratings, as well as of a dye called gallocyanin, obtained by the action of nitroso-dimethyl-aniline on tannic acid, which also I have found is a strong sensitiser for the red rays.

I have also lately been trying a new fluorescent phthalein dye, recently introduced by the Badische Anilin and Soda Fabrik, called Rhodamine (the phthalein of meta-amido phenol) which I thought might be likely to be useful in orthochromatic photography for copying coloured drawings &c. It undoubtedly has capabilities in this direction, but so far as I have tried it, seems inferior to erythrosin in sensitiveness for yellow. It is prepared by fusing phthalic anhydride with diethyl-meta-amido-phenol and forms a reddish violet powder, very easily soluble in water, the solution being of a bright crimson with a strong orange fluorescence. It is not very soluble in alcohol. Acetic acid dissolves it and the solution shows a very vivid scarlet fluorescence. Ammonia produces no visible change. Dilute mineral acids slightly redden, but do not, as with the eosins, destroy the fluorescence of its watery solutions; on the contrary they rather heighten it. Nitrate of silver precipitates it from the watery solution, but not readily; the brick-red precipitate is very soluble in pure water.

Examined in the spectroscope a strong watery solution absorbs the spectrum strongly in the blue, green and yellow from $\alpha\ \frac{1}{2}$ D to F $\frac{1}{2}$ G, though the only distinct absorption band with a weak solution is about midway between D and E.

Gelatine dry plates stained with a solution of rhodamine in distilled water at 1 : 10,000 with 1% of solution of ammonia, show two very marked regions of increased action—one between G and F, the other from E to D, strongest from D to D $\frac{1}{2}$ E. The photographs taken with the small spectrograph show a curious but well marked series of bands of increased sensitiveness in the parts of the spectrum where the

action of the dye is most marked. The action of the yellow rays about D is quite as strong as, if not stronger than on plates stained with the best of the eosin dyes, but for copying coloured pictures I have not found rhodamine with ammonia equal to erythrosin either with or without a yellow screen; further trial is, however, requisite.

The addition of a small quantity of nitrate of silver to the ammoniacal solution of rhodamine greatly increases the general sensitiveness of the plates, but does not seem to heighten the yellow-sensitiveness, either with the spectrum or with coloured pictures, so much as it does with erythrosin.

It is, however, noticeable that plates stained with a solution of the dye containing acetic acid in place of ammonia appear almost as sensitive in the yellow as those prepared with ammonia and give about equally good results for copying work: if on further experience this is proved and found to work with certainty, it will be of importance, because the use of eosin dyes in conjunction with ammonia for staining gelatine dry plates for orthochromatic photography has been protected by various patents. It is possible that further experiments with acid-stained plates in conjunction with the use of specially suitable yellow screens might result in a method of using this dye for orthochromatic photography which would be efficient and open to general use.

In photographing the spectrum with the concave gratings I have found the rhodamine-stained plates useful for the region immediately about D. On a plate I have with me, showing the D lines in the second order, 7 lines can be clearly seen between $D_1$ and $D_2$, though 11 are sometimes visible to the eye.

Another new dye from the same manufactory called *Nile Blue*, which also belongs to the rhodamine series, shows considerable sensitiveness to the region between D and B, by the addition of ammonia; though not so much so as alizarin blue. Without ammonia the general sensitiveness of the plate is much reduced, as Dr. Eder has remarked is the case with most blue dyes, and the image of the spectrum does not extend beyond b.

It is noticeable that the spectrum taken in the small spectrograph on plates stained with the ammoniacal solution of this dye shows numerous narrow bands of extra sensitiveness similar to those in the spectrum of rhodamine, showing that both dyes belong to the same group. These bands in the photographed spectra of the two dyes would be an interesting subject for further enquiry.

I have to acknowledge the kindness with which the managers of the Badische Anilin and Soda Fabrik have supplied me with samples of the dyes referred to.

The following papers were read—

1. *On the species of* Thelyphonus *inhabiting Continental India, Burma, and the Malay Peninsula.—By* Eugene W. Oates, Esq., F. Z. S. *Communicated by the* Natural History Secretary.

2. *Notes on the ruins of Jay Mangla Garh (with 2 Buddhist coins).—By* Asutosh Gupta, Esq., C. S.

Jaimangla garh may be described as an island surrounded by an extensive garh or artificial lake. It is an extensive mound about seven square miles in area, now overgrown with jungle. The garh is a vast sheet of water, about seven miles long on either side of the island, its breadth varying from about 300 to 500 yards. Its area is therefore about four square miles. It is shown in the district map as Kabur Tal lake. Its southern extremity is about twelve miles north of Beguserai, the head quarters of the subdivision of that name in the district of Monghyr. Being north of the Ganges, it is in old Mithila. The water of the lake is remarkably fresh and salubrious, though it is overgrown with weeds. It abounds in fishes and game birds and except during the rains when it is too full, it is the daily resort of a large number of fishermen. Navigation is made by long narrow skiffs scooped out of single *sal* trees.

The place contains ruins of old brick built gates and spacious buildings. It is strange that there is no local tradition about it. There is a large earthen mound or hillock about half a mile north-east of the lake, which is said to have been built by Viswakarma, the mythological architect of heaven. The bricks found in Jaimangla garh are of the same small size which characterize ancient architecture. The place is no doubt the ruins of a large ancient city, apparently the fort of some old Hindu Raja.

The place takes its present name from the goddess Jaymangla, a stone idol of Bhagavati placed in an old, dark, miserable, brick built shrine without any inscription to show its age. It is visited by flocks of pilgrims from various places on Tuesdays and Saturdays when the goddess is worshipped.

The only reliable material evidence I could get of the antiquity of the place consists of two copper coins, which are being forwarded to the Asiatic Society. These are irregularly shaped old coins which I collected from the place.

There is apparently no letter in them but there are some symbols on one side and an elephant looking animal on the other.

3. *Three new Homoptera.—By* M. L. Lethierry. *Communicated by* E. T. Atkinson, Esq., C. S.

The following descriptions refer to the small homopterons found in such abundance on the mango tree in the early part of the year and indeed up to the rains. Some account of them has been given in the Indian Museum 'Notes on Economic Entomology,' No. III, and their life-history is now being investigated.

### Idiocerus niveosparsus.

Flavescens, fusco et albo variegatus : vertice subtilissime aciculato-strigoso, medio infuscato, vertice utrinque puncto minutissimo nigro: fronte subtilissime aciculato-strigosa, flava ; clypeo flavo, macula basali nigra : pronoto flavo, fusco-irrorato : scutello basi utrinque macula triangulari, medioque vitta angusta usque ad medium continuata, ibique punctis duobus minutis, nigris ; summo apice albo : tegminibus nitidis, griseoflavis, subpellucidis, venis fuscis, fascia subbasali interrupta alba, maculaque parva irregulari ad apicem corii alba ; lateribus maculis duabus, una media, oblonga, altera apicali, nigris, spatio insigni albo-hyalino interruptis : corpore cum pedibus subtus fusco-variegato, unguiculis nigris.—Long. 4 millim, ♂ ♀. *I notato*, Fabr. affinis : maculis lateralibus nigris et spatio laterali hyalino tegminum distinctus.

Hab. Saharanpur, Calcutta.

### Idiocerus Atkinsoni.

Elongatus, flavescens : vertice medio infuscato, puncto basali punctoque laterali medio utrinque distinctissimo, nigris, ornato : fronte flava : clypeo flavo, linea media longitudinali parva nigra, strigisque lateralibus minutissimis fuscis : pronoto flavo, linea longitudinali angusta media fusca, punctisque duobus anticis nigris : scutello basi utrinque macula triangulari nigra, medioque vitta angusta antice et postice dilatata, fusca, punctisque duobus fuscis : tegminibus subpellucidis, venis fuscis, immaculatis : corpore subtus cum pedibus flavo, unguiculis fuscis.—Long. 5 millim. ♂, ♀.

Hab. Calcutta, Baliganj.

### Idiocerus clypealis.

Minor, flavescens : vertice flavo, aut immaculato, aut punctis duobus lateralibus (uno utrinque) nigris ornato : fronte flava, aut immaculata, aut punctis duobus mediis nigris ornato : clypeo flavo, in medio semper vitta angusta nigra, ad basim latiori, ornato : pronoto flavo, immaculato : scutello flavo, basi utrinque macula obtuse triangulari nigra ornato : tegminibus flavis, nitidis, venis concoloribus, vena costali dilutius flava, intus in medio nigro angustissime cincta : corpore subtus flavo, macula

laterali sat magna prosterni nigra: pedibus cum unguiculis flavis. Long, $3\frac{1}{2}$ millim. ♂, ♀. Species pictura clypei insignis.

Hab. Calcutta.

4. *Græco-Roman influence on the civilization of Ancient India.—By* V. A. Smith, Esq., C. S. (postponed from last meeting).

An abstract only of this paper was read. The paper itself which had not yet been received, will be read at a subsequent meeting, in the Proceedings of which the abstract will be published.

5. *Notes on some of the symbols found on the punch marked Coins of Hindustan, and on their relationship to the Archaic symbolism of other races and distant lands.—By* W. Theobald, Esq., M. R. A. S.

The paper will be published in the Journal, Part I.

6. *Note on Stokes' Theorem and Hydrokinetic circulation.—By* Asutosh Mukhopádhyáy, M. A., F. R. A S, F. R. S. E.

(Abstract.)

The object of this note is to give a new proof of Stokes' formula for hydrokinetic circulation, and to point out how it is an immediate consequence of the theory of the change of the variables in a multiple integral. It is pointed out that as no physical conception enters into the proof, it holds good whether we regard the theorem as a purely analytical one or as merely furnishing a formula for hydrokinetic circulation.

7. *A descriptive list of the Uredineæ occurring in the neighbourhood of Simla (Western Himalayas). Part II,* Puccinia.—*By* A. Barclay, M. B., *Bengal Medical Service.*

These papers will be published in full in the Journal, Part II.

## Library.

The following additions have been made to the Library since the meeting held in March last.

### Transactions, Proceedings and Journals,

*presented by the respective Societies and Editors.*

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Tijdschrift voor Indische Taal-, Land-en Volkenkunde. Deel XXXII, Aflevering 5.

Berlin. Entomologischen Verein in Berlin,—Entomologische Zeitschrift, Band XXXII, Heft 2.

Braunschweig. Des Vereins für Naturwissenschaft zu Braunschweig,—Jahresbericht, 1880-87.

Brisbane. Royal Society, Queensland,—Proceedings, Vol. V, Part 5.

Budapest. La Société Hongroise de Géographie,—Bulletin, Tome XVII, Nos. 1 and 2.

Calcutta. Geological Survey of India,—Records. Vol. XXII, Part 1.

———. Indian Engineering,—Vol. V, Nos. 10-13 and Index to Vol. IV.

———. Meteorological Observations recorded at seven stations in India, corrected and reduced. October to December, 1888.

———. Photographic Society of India,—Journal, No. 9, March, 1889.

———. The Indian Engineer,—Vol. VI, Nos. 23-26.

Florence. La Società Africana d' Italia,—Bullettino, Tome IV, Fascicolo 8°.

Havre. Société de Géographie Commerciale du Havre,—Bulletin. Janvier—Février, 1889.

Ithaca. Cornell University,—Library Bulletin. Vol. II, No. 2.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Abhandlungen. Band XLII, Heft 4.

London. Institution of Electrical Engineers,—Journal, Vol. XVIII, No. 77.

———. Nature,—Vol. XXXIX, Nos. 1008-1011.

———. The Academy,—Nos. 877-880.

———. The Athenæum,—Nos. 3200-3203.

———. Zoological Society of London,—Transactions, Vol. XII, Part 8.

Mendon, Ill. The American Antiquarian and Oriental Journal,—Vol. XI, No. 1.

Naples. La Società Africana D'Italia,—Bollettino, Tome VII, Nos. 11 et 15.

Paris. La Société de Géographie,—Bulletin, Tome IX, No. 4.

———. ———. Compte Rendu des Séances,—Nos. 4 et 5, 1889.

Pisa. La Società Toscana di Scienze Naturali,—Atti (Processi Verbali). Tome, VI.

Rio de Janeiro. Imperial Observatorio do Rio de Janeiro,—Revista do Observatorio. Anno IV, No 1.

Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Tome XVII, Disp. 12ª. Tome XVIII, Disp. 1ª, et Indice, Tome XVII.

Stockholm. Entomologisk Tidskrift,—Band I—VI and Band IX.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Tome XXIV, Nos. 3-5, et Elenco Degli Accademici Residenti, Nazionali non Residenti, Stranieri e Corrispondenti al 1° Gennaio, 1889.

Vienna. Der K. K. Géologische Reichsanstalt,—Verhandlungen. Nr. 2, 1889.

## Books and Pamphlets,

*presented by the Authors, Translators, &c.*

Lalchand, Pundit. Jubilee Pramodika. Brief descript of the Jubilee of Her Majesty, the Queen Empress, Kaisar Hind, in Sanskrit, Poems. 8vo. Bombay, 1888.

Lanman, Charles Rockwell. A Sanskrit Reader: with Vocabulary and Notes. 8vo. Boston, 1888.

Roy, Pratap Chandra. The Mahábhárata, translated into English prose. Part 47. 8vo. Calcutta, 1889.

## Miscellaneous Presentations.

Algemeen Reglement en Reglement van orde voor het Bataviaasch Genootschap van Kunsten en Wetenschappen opgericht op den 24 sten April 1778 onder de Zinspreuk: "Tot Nut Van 'T Algemeen." 8vo. Batavia, 1889.

Verslag van de Werkzaamheden en Verrichtingen van het Bataviaasch Genootschap van Kunsten en Wetenshappen, uitgebracht Door den Voorzitter in de Algemeene Vergadering van 27 December 1888. 8vo. Batavia, 1889.

Bataviaasch Genootschap van Kunsten en Wetenschappen, Batavia.

Report on the Administration of the Registration Department in Bengal for the year 1887-88. By J. G. Ritchie, Esq., Offg. Inspector-General of Registration. Fcp. Calcutta, 1888.

Government of Bengal.

The Voyage of François Pyrard, of Laval, to the East Indies, the Maldives, the Moluccas and Brazil; translated into English from the third French edition of 1619, and edited with notes by Albert Gray. Vol. II, Part I (Hakluyt Society). 8vo. London, 1888.

Government of India, Home Department.

Epigraphia Indica and Record of the Archæological Survey of India, Part II, January, 1889. Calcutta, 1889.

Government of India, Rev. and Agri. Department.

Annual Return of the Civil Hospitals and Dispensaries in the Madras Presidency for the year 1887. Fcp. Madras, 1888.

Progress Report of the Archæological Survey of India, for October and November 1888. By A. Rea Ez. Fcp. Madras, 1889.

Progress Report of the Archæological Survey of Southern India for December 1888 and January 1889. By Dr. E. Hiltzsch. Fcp. Madras, 1889.

Report on Public Instruction in the Madras Presidency for 1887-88. Fcp. Madras, 1838.

Government of Madras.

Catalogue of Sanskrit Manuscripts in the Sanskrit College Library, Benares; with full index. 8vo. Allahabad.

Report on the Administration of the N. W. Provinces and Oudh, for the year ending 31st March, 1888. Fcp. Allahabad, 1889.

Government of N.-W. Provinces and Oudh.

Herbert Breakspear, a Legend of the Mahratta War. By Edward Sellon. 8vo. London, 1848.

Works by Shah Bhadurshah, Ex-King of Delhi, under the title of poet Zuffur. Vols. I—IV (in 2 vols). 8vo.

W. Sandford, Esq.

Scientific Memoirs by Medical Officers of the Army of India, Part IV. 4to. Calcutta, 1889.

Sanitary Commissioner with the Govt. of India.

Report of the Resident of Yale University 1887-88. 8vo. 1889.

Yale University.

## Periodicals Purchased.

Calcutta. Calcutta Review,—Vol. LXXXVII, No. 176. April, 1889.

———. Indian Medical Gazette,—Vol. XXIV, No. 2, February, 1889.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXI, Nos. 1 et 2.

Leipzig. Annalen der Physik und Chemie,—Band XXXVI, Heft 3.

———. ———. Beiblätter, Band, XIII, Stück 2.

London. The Chemical News,—Vol. LIX, Nos. 1526-1529.

———. The Nineteenth Century,—Vol. XXV, No. 145, March, 1889.

———. The Society of Arts,—Journal, Vol. XXXVII, Nos. 1892-1895.

Paris. Revue Scientifique,—Tome XLIII, (3e série), Nos. 8-11.

## Books Purchased.

Gilchrist, John. A Dictionary, English and Hindoostanee. Pts. 1 and 2. 4to. Calcutta, 1790.

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

## For May, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 1st May, 1889, at 9-15 P. M.

Lieut.-Col. J. Waterhouse, President, in the Chair.

The following members were present: H. Beveridge, Esq., Bábú Bupendra Sri Ghosha, Kumár Rameswár Máliah, J. Mann, Esq., R. D. Mehtá, Esq., W. H. Miles, Esq., Pandit Nilmani Mukerjee, Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., A. Pedler, Esq., Dr. P. K. Ray, Dr. J. Scully, Bábú Hiralál Sen, C. H. Tawney, Esq., D. Waldie, Esq.

Visitor—Captain J. Hayes Sadler.

The Minutes of the last meeting were read and confirmed.

Forty-two presentations were announced as detailed in the Library List appended.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members:

Rev. J. Muir Hamilton.
Maulvi Dilawar Hossain Ahmad, B. A., (re-elected).
Hon. Justice Gurudás Banerjee, M. A., D. L.

The following gentlemen are candidates for election at the next meeting:—

Dr. O'Connell Raye (for re-election), proposed by Dr. J. Scully, seconded by Lt.-Col. J. Waterhouse.

Rev. Walter Hamilton, proposed by L. de Nicéville, Esq., seconded by C. Little, Esq.

F. J. Rowe, Esq., proposed by A. Pedler, Esq., seconded by C. Little, Esq.

Captain J. Hayes Sadler, Offg. Under-Secretary, Government of India, Legislative Department, proposed by E. T. Atkinson, Esq., seconded by Lieut.-Col. J. Waterhouse.

The following gentleman has expressed a wish to withdraw from the Society :

R. A. Sterndale, Esq.

The Secretary announced the death of the following Member :

Maulvi Kabir-ud-din Ahmad.

The President announced that Dr. A. Crombie, had been elected a member of the Council in the room of the Hon. A. Wilson, resigned in consequence of proceeding to England on furlough.

The President exhibited a photograph of the palm tree (*Corypha* sp. inc.) now flowering in the Society's grounds, presented by J. T. Gladstone, Esq.

The Philological Secretary exhibited a palm leaf Burmese Manuscript containing the nine chapters of Abhidhammatthasangae kampathanasangahavilbhago, or Sañgro Pali, with a commentary, presented to the Society by H. C. Blaker, Esq. ; and read the following report on a find of old copper coins in the Benares district.

Report, on 4 old copper coins forwarded by the Collector and Magistrate of Benares with his No. $\frac{1}{\text{XII-48}}$ dated the 16th January, 1889.

In his letter the Collector states that, on the 7th August 1888, 14 seers of copper pies were found in the jurisdiction of Chaubepur Police Circle in the Benares district. Only 4 specimens,—those sent for identification—were retained, while the rest were returned to the finder and not treated under the Treasure Trove Act. This is to be regretted, because the four samples turned out to be coins of considerable interest. The Collector was at once applied to, to secure, if possible, the balance ; but it was too late ; the balance could not be obtained any longer. I would take the liberty to suggest, that instruction should be given by Government, that no Treasure Trove Coins should be disposed of without first awaiting the result of the examination of the coins by the Asiatic Society of Bengal.

The four samples, sent for examination, belong all to the Indo-Scythian period (from about 150 B. C. to 300 A. D.) Two of them are large copper coins of Kadphises, (1st cent. B. C.) of the well-known bilingual type, figured in the *Ariana Antiqua* (Plate X, figs. 15-18). Another is a coin of Kanerki (1st cent. A. D.), of the four-handed OKPO type, as figured in *Ariana Antiqua*, plate XII, fig. 17. The

fourth is a coin of the so-called Kenorano or Ooer (probably *Oerki*, 2nd cent. A. D.), with the cross-legged sitting king on the obverse, and the standing MAO on the reverse, as shown in *Ariana Antiqua*, pl. XIII, fig. 10. All these coins are in rather indifferent preservation; the legends being nearly obliterated, though both the obverse and reverse figures are well distinct.

The interest of these coins is, that copper coins of the Indo-Scythian kings whose rule extended not much beyond Mathurá, should be found so far to the East as the Benares district; and it would have been of some importance to know whether any more (and perhaps better preserved) specimens of this class of coins were contained among the 14 seers of copper pice.

The following papers were read—

1. *Notes on Indian* Rhynchota, *No.* 6. *Family* Coreidæ.—*By* E. T. Atkinson, Esq., B. A.

2. *Note on the volatility of some of the compounds of Mercury, and of the metal itself.*—*By* A. Pedler, Esq., F. C. S.

(Abstract.)

The volatility of the metal mercury at ordinary atmospheric temperatures has already been shewn by several previous observers. A good instance of the very considerable volatility of the metal is described as having occurred in a Barometer at the meteorological observatory at Buxar, where considerably more than half a gramme of the metal had been actually distilled into the upper part of the Torricellian vacuum of the Barometer. The fact that such a large quantity of mercury can thus distil upwards is one of which meteorologists should take note, for had the barometer in question been constructed on what is called the Kew principle, which is the case with a very large proportion of the barometers that are used, the distillation of this quantity of mercury in the instrument would have utterly vitiated all its readings by causing them to be distinctly lower than they should have been.

Experiments as to the volatility of mercurial compounds were made on the following substances:—Mercuric oxide, mercuric cyanide, mercuric oxalate, mercuric iodide, mercuric bromide mercurous chloride (calomel) and mercuric chloride (corrosive sublimate). The experiments were usually made in vacuó and in a part of the vacuous space, containing the mercurial compound, some re-agent was placed which had the power of combining with and fixing one of the constituents of the substance experimented on. The volatility was determined under the conditions of an Indian climate (in Calcutta) generally at temperatures obtained in full sunlight, but also in some cases at shade tempera-

tures and in the dark. When tested in this way it is found that mercuric oxide when exposed to sunlight in vacuó is distinctly volatile. A small portion of the mercuric oxide is also decomposed into mercurous oxide. Mercuric cyanide appears to be quite non-volatile under these conditions, the salt is also not decomposed by the action of sunlight. Mercuric oxalate appears also to be non-valatile but under the influence of sunlight it decomposes entirely into mercury and carbon dioxide. Mercuric iodide was quite non-volatile, and it was also practically undecomposed by the action of light, for though by exposure to sunlight it darkened, yet on re-exposure to the air in diffused day-light its original colour was regained. Mercuric bromide is very distinctly volatile in vacuó in sunlight; a small portion of the mercuric bromide is also decomposed into mercurous bromide. Mercuric chloride is very decidedly volatile in vacuó both in sunlight and also when kept in the dark. It is so volatile indeed that the loss in weight can be easily determined. Mercuric chloride also partly decomposes under the influence of light, and distinct amounts of mercurous chloride (calomel) are formed. A similar decomposition to the latter is also shewn to take place in solution, but this last fact has been previously known. Mercurous chloride appears to be volatile in vacuó in sunlight in an exceedingly feeble manner, but the sunlight also decomposed it distinctly but partially into mercury and free chlorine.

Attention is prominently drawn to the importance of the fact of the volatility of mercuric chloride inasmuch as this salt is very largely used, particularly in India. Its uses are as an antiseptic and for preserving perishable materials and for protecting books, specimens &c. from the attacks of insects.

Cases of mercurial poisoning from the use of mercuric chloride as a preservative are quoted, which have apparently been put down to the existence of solid particles of mercuric chloride floating in the air, and which have been thrown off from surfaces like dust, but it is pointed out that the volatility of the salt which has now been proved is a much more probable cause of this poisonous action.

The PRESIDENT remarked that in the light of Mr. Pedler's experiments it seemed very probable that the fading of photographic negatives that had been intensified with bichloride of mercury, in conjunction either with alkaline iodides and sulphides or with liquor ammonia, as is commonly the practice both for wet and dry plates, might be partly due to the volatilisation of the mercurial compound formed. Such fading was very common in this country and high temperature would increase the tendency if due to this cause. Bichloride of mercury was a

very valuable preservative for books and dried vegetable specimens, and Mr. Pedler's warning would be useful to those unaware of its volatile properties.

The papers will be published in full in the Journal, Part II.

Captain Sadler exhibited his fine collection of Birds' eggs.

## Library.

The following additions have been made to the Library since the meeting held in April last.

### Transactions, Proceedings and Journals,

*presented by the respective Societies and Editors.*

Budapest. La Société Hongroise de Géographie, Bulletin, Tome. XVII, Fasciculi, 3.

Calcutta. Agricultural and Horticultural Society of India,—Journal, Vol. VIII, (new series), Part 3.

———. Indian Meteorological Memoirs,—Vol. IV, Part 6.

———. Indian Engineering,—Vol. V, Nos. 14—17.

———. The Indian Engineer,—Vol. VII, (new series) Nos. 1—5.

Copenhagen. K. Nordiske Oldskrift-Selskab,—Aarboger, Raekke II, Bind III, Hefte 4. Bind IV, Hefte 1.

Dorpat. Der Naturforscher-Gesellschaft bei der Universität Dorpat,—Sitzungsberichte, Band VIII, Heft 2.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. V, No. 2, February, 1889.

Frankfurt, a O. Des Naturwissenschaft. Vereins des Reg-Bez. Frankfurt,—Monatliche Mittheilungen aus dem Gesammtgebiete der Naturwissenschaften, Jahrgang VI, Nrn. 4—6.

Halle. Der Kaiserlichen Leopoldino-Carolinischen Deutschen Akademie der Naturforscher,—Leopoldino, Heft XXIV, Jahrgang 1888.

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Leige. Société Geologique de Belgique,—Tome XIII, 1re et 2e Livraison; Tome XIV, 1re Lavraison; et Tome XV, 1re —3e Lavraison.

London. Institution of Electrical Engineers, Journal, Vol. XVIII, No. 78.

———. Institution of Mechanical Engineers,—Proceedings, No. 4, 1888.

———. Nature,—Vol. XXXIX, Nos. 1012—1015.

London. Royal Asiatic Society of Great Britain and Ireland,—Journal, Vol. XX, Part 4.

———. Royal Astronomical Society,—Monthly Notices, Vol. XLIX, No. 3.

———. Royal Geographical Society,—Proceedings, Vol. XI, No. 2.

———. Royal Microscopical Society,—Journal, December, 1888 and February, 1889.

———. Royal Society,—Proceedings, Vol. XLV, Nos. 273—275.

———. Royal Statistical Society,—Journal, Vol. LI, Part 4.

———. The Academy,—Nos. 882—884.

———. The Athenæum,—Nos. 3204—3207.

Lyon. La Société D'Anthropologie de Lyon,—Bulletin, Tome VII, No. 3.

Manchester. The Manchester Literary and Philosophical Society,—Memoirs and Proceedings, Fourth series, Vol. I.

Mendon. The American Antiquarian and Oriental Journal, Vol. XI, No. 2.

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Rome. La Sociétá degli Spettroscopisti Italiani,—Memorie, Vol. XVIII, Disp. 2ª .

St. Petersburg. L' Académie Impériale des Sciences de St. Pétersbourg, Mémoires. Tome XXXVI, Nos. 6—11.

Sydney. Linnean Society of New South Wales,—Proceedings, Vol. III, (2nd series), Part 4.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXIV, Disp. 6ª et 7ª .

Vienna. Der K. K. Geologischen Reichsanstalt,—Jahrbuch. Band. XXXVII, Heft 3 und 4, Band XXXVIII, Heft 1 und 2.

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———. Der Kaiserlischen Akademie der Wissenschaften,—Almanach, 1887.

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———. ———. Denkschriften (Mathematisch-Naturwissenschaftliche Classe), Band LIII.

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*presented by the Authors, Translators, &c.*

Dames, M. Longworth, C. S., M. R. A. S. The Coins of the Durranis (Reprinted from the Numismatic Chronicle, 3rd Series, Vol. VIII). 8vo. London, 1888.

Haeckel, Ernst, M. D., Ph. D. Report on the Siphonophoræ collected by H. M. S. Challenger during the years 1873-76 (The Voyage of H. M. S. Challenger. Zoology. Vol. XXVIII.) 4to. Edinburgh, 1888.

Haeckel, Ernst, M. D., Ph. D. Die Radiolarien. 3rd Theil. Die Acantharien oder Actipyleen Radiolarien. 4to. Berlin, 1888.

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Lyman, Benj. Smith. A Geological and Topographical Map of the New Boston and Morea Coal Lands, in Schuylkill, County Penn'a. Sheet. Philadelphia, 1889.

Payne, F. F. Eskimo of Hudson's Strait (Extract from Proceedings of Canadian Institute, 1889). 8vo. Toronto, 1889.

Roy, Pratap Chandra, C. I. E. The Mahábhárata, translated into English Prose, Part 48. 8vo. Calcutta, 1889.

## Miscellaneous Presentations.

Monumenta Tridentina, Beiträge zur Geschichte des Concils von Trient. Von August von Druffel. Heft III, Januar-Februar, 1546. 4to. München, 1887.

Das Bayerische Praecisions-Nivellement. Siebente Mitteilung. Von Carl Max von Bauernfeind. 4to. München, 1888.

Ueber historische Dramen der Römer. Festrede gehalten in der öffentlichen Sitzung der K. Akademie der Wissenschaften zu München am 15 November 1887, von Dr. Karl Meiser. 4to. München, 1887.

K. Akademie der Wissenschaften zu München.

Astronomische Untersuchung über die angebliche Finsterniss unter Thakelath II von Ägypten, von Dr. Eduard Mahler. (Aus den Denkschriften der K. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe, Bd. LIV). 4to. Vienna, 1888.

Bahnbestimmung des Meteors vom 21 April, 1887, von Prof. G. v. Niessl. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien, II. Abth. Bd. XCVI). 8vo. Vienna, 1887.

Bodentemperaturbeobachtungen im Hinterlande der Walfischbay, von Dr. F. M. Stapff. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe. Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Die tägliche und jährliche Periode der magnetischen Inclination, von J. Liznar. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe, Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Entgegengekuppelte Fadenwagen zur absoluten Kraftmessung, von G. Jaumann. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVI, Abth. II). 8vo. Vienna, 1888.

Magnetische Ortsbestimmungen an den südöstlichen Grenzen Österreich-Ungarns, von Eugen Gelcich. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Methode und Apparat zur Erzeugung gleichgerichteter Inductionsströme, sowie Anwendung derselben zur Widerstandsbestimmung der Elektrolyte, von Johann Carl Pürthner. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Resultate des ersten Jahrganges der meteorologischen Beobachtungen auf dem Sonnblick (3095 *m.*), von J Hann. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Über die Frage nach der Existenz von Kometen-systemen, von Dr. J. Holetschek. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Bd. XCVI, Abth. II). 8vo. Vienna, 1887.

Über die optischen Eigenschaften des Tabaschir, von E. Brücke. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Über eine einfache Vorrichtung zur Bestimmung der Temperaturänderungen beim Ausdehnen und Zusammenziehen von Metalldrähten, von Prof. Dr. A. Wassmuth. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Über thermomagnetische Motoren, von J Stefan. (Aus den Sitzb. d. k. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

Weitere Beobachtungen über atmosphärische Elektricität, von Prof. Franz Exner, (Aus den Sitzb. d. K. Akad. der Wissensch. in Wien. Mathem.-naturw. Classe; Bd. XCVII, Abth. II). 8vo. Vienna, 1888.

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K. Akademie der Wissenschaften in Wien.

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Neue Untersuchungen über die Bessel'sche Formel und deren Verwendung in der Meteorologie, von Dr. Karl Weihrauch. (Schriften herausgegeben von der Naturforscher-Gesellschaft bei der Universität Dorpat). 8vo. Dorpat, 1888.

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Lakshmisvara Vilasa, by Chandra Kavi. 8vo. Durbhanga. Saka, 1810.

Lakshmisvara Bhushana, by Sivaprasad Kavisvara. Hindi. 8vo. Durbhanga. Saka, 1808.

Mithilatirtha prakasa, by Sri Krishna Sarama. 8vo. Durbhanga. Saka, 1810.

Purusha pariksha, by Vidyapati. 8vo. Durbhanga. Saka, 1810.

H. H. THE MAHARAJA OF DURBHANGA.

Returns of the Rail-borne trade of Bengal for the quarter ending the 31st December 1888. Fcp. Calcutta, 1889.

The Indian Forester, March 1889. 8vo. Roorkee, 1889.

GOVERNMENT OF BENGAL.

The Indian Antiquary, February 1889. 4to. Bombay, 1889.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Report on the Administration of the Punjab and its Dependencies for 1887-88. Fcp. Lahore, 1889.

GOVERNMENT OF THE PUNJAB.

Annual Report of the Second Geological Survey of Pennsylvania for 1886, Part IV, with Atlas; and Atlas Part II, A. A.

SECOND GEOLOGICAL SURVEY OF PENNSYLVANIA.

Report of the Banquet given by the Learned Societies of Philadelphia in commemoration of the framing and signing of the Constitution of the United States, September 17th, 1887. 8vo. Philadelphia, 1888.

FREDERICK D. STONE, ESQ.

Monographs of the United States Geological Survey, Vol. XII. Geology and Mining Industry of Leadville, Colorado, with Atlas. By Samuel Franklin Emmons. 4to. Washington, 1886.

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London. Mind,—Vol. XIV, No. 54, April, 1889.

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## Books Purchased.

Burnell, A. C., C. S. The Law of Inheritance, translated from the unpublished Sanskrit Text of the Vyavahâra-Kânda of the Mâdhavîya commentary on the Parâçara-Smṛti. 8vo. Madras, 1868.

Gould, John, F. R. S. The Birds of New Guinea, Part 25. Fol. London, 1888.

Kearns, Rev. J. F. Kalyán'a Shaṭ'anku, or the Marriage Ceremonies of the Hindus of South India, together with a description of Karúm'antharum or the Funeral Ceremonies, &c. 8vo. Madras, 1868.

Lóventhal, Rev. E. The Coins of Tinnevelly. 8vo. Madras, 1888.

Oldenberg, Hermann. Die Hymnen des Rigveda, Band I. Metrische und textgeschichtliche Prolegomena. 8vo. Berlin, 1888.

Wilks, Lieut.-Colonel Mark. Historical Sketches of the South of India, in an attempt to trace the History of Mysoor. 2nd Edition, vols. I and II. 8vo. Madras, 1869.

The Zoological Record for 1887. 8vo. London, 1888.

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

FOR JUNE, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 5th June, 1889 at 9-15 P. M.

LIEUT.-COL. J. WATERHOUSE, President, in the Chair.

The following members were present :—

H. Beveridge, Esq., E. C. Cotes, Esq., E. Gay, Esq., Bábú Bhupendra Sri Ghosha, A. Hogg, Esq., E. J. Jones, Esq.. Dr. W. King, C. Little, Esq., W. H. Miles, Esq., Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., W. L. Sclater, Esq., Bábú Heralal Sen, Bábú Haraprasád Shástri, D. Waldie, Esq.

The minutes of the last meeting were read and confirmed.

Twenty-five presentations were announced, details of which are given in the Library List appended.

The following gentlemen, duly proposed and seconded at the last meeting of the Society, were ballotted for and elected Ordinary Members :—

Dr. O'Connell Raye (re-elected).
Rev. Walter A. Hamilton.
F. J. Rowe, Esq.
Capt. J. Hayes Sadler.

The following gentleman is a candidate for election at the next meeting :—

Lala Brij Bhukhan Lall, proposed by E. E. Oliver, Esq., seconded by C. Little, Esq.

The following gentlemen have expressed a wish to withdraw from the Society :—

J. Wilson, Esq., C. S.
R. Whittal, Esq.

The Secretary reported the death of the following member :—

Hon. Ráo Sáheb Visvanáth Náráyana Mandlik, C. S. I.

The Secretary announced that R. D. Mehtá, Esq. had compounded his subscription as a Resident member by the payment in a single sum of Rs. 390.

Mr. Wood-Mason exhibited 4 Cannon balls (?) and 1 Musket ball found six feet below the surface of the ground at the Katholya gate of Rohtas fortress by Mr. H. B. W. Garrick, Archæological Survey of Bengal.

Mr. E. C. Cotes exhibited specimens of the silkworm fly.

The following papers were read—

1. *Catalogue of the* Insecta, *Order* Rhynchota. *Sub-order* Hemiptera Heteroptera. *Family* Capsidæ.—*By* E. T. Atkinson, Esq., C. S.

2. *On a curve of Aberrancy.*—*By* Asutosh Mukhopádhyay, M. A., F. R. A. S., F. R. S. E.

(Abstract.)

The object of this note is to prove that the aberrancy curve (which is the locus of the centre of the conic of closest contact) of a plane cubic of Newton's fourth class is another plane cubic of the same class, the invariants of which are proportional to the invariants of the original cubic; it is also proved that the two cubics have only one common point of intersection, which is the point of inflexion for both.

The papers will be printed in the Journal, Part II.

## Library.

The following additions have been made to the Library since the meeting held in May last.

### Transactions, Proceedings and Journals,

*presented by the respective Societies and Editors.*

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—
Notulen, Deel XXVI, Aflevering 4.

Batavia. Bataviaasch Genootschap van Kunsten en Wetenschappen,—Tijdschrift voor Indische Taal-, Land-en Volkenkunde, Deel XXXII Aflevering 6.

———. Koninklijke Natuurkundige Vereeniging in Netherlandsch-Indië,—Natuurkundig Tijdschrift voor Nederlandsch-Indië, Deel XLVIII.

Bombay. Anthropological Society of Bombay,—Journal, Vol. I, No. 6.

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Brisbane. Royal Society of Queensland,—Proceedings, Vol. VI, Part I.

Calcutta. Indian Engineering,—Vol. V, Nos. 18—22.

———. The Indian Engineer,—Vol. VII, No. 6.

Florence. La Società Africana d' Italia,—Bullettino, Tome V, Fascicolo 1°—3°.

———. La Società Italiana di Antropologia, Etnologia e Psicologia Comparata,—Archivio per L' Antropologia e la Etnologia, Vol. XVIII, Fascicolo 3°.

Giessen. Der Oberhessischen Gesellschaft für Natur-und Heilkunde,—Bericht, XXVI.

Graz. Des Naturwissenschaftlichen Vereines für Steiermark,—Mittheilungen, Jahrggang 1888.

The Hague. Koninklijk Instituut voor de Taal,- Land-en Volkenkunde van Nederlandsch-Indië,—Bijdragen tot de Taal- Land-en Volkenkunde van Nederlandsch-Indië, Deel IV (5e Volgr), Aflevering 2.

Leipzig. Der Deutschen Morgenländischen Gesellschaft,—Zeitschrift, Band XLIII, Heft 1.

London. Institution of Electrical Engineers,—Journal, Vol. XVIII, No. 79.

———. Nature,—Vol. XXXIX, Nos. 1016—1020.

———. The Academy,—Nos. 885—889.

———. The Athenæum, Nos. 3208—3212.

Mendon. The American Antiquarian and Oriental Journal,—Vol. XI, No. 3.

Paris. La Société De Géographie,—Compte Rendu des Séances, No. 7, 1889.

Rio de Janeiro. Imperial Observatorio do Rio de Janeiro,—Revista do Observatorio, Anno IV, No. 2.

Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XVIII, Dispensa 3a.

Simla. United Service Institution of India,—Journal, Vol. XVIII, No. 75.

Tōkyō. Imperial University of Japan,—Journal of the College of Science, Vol. II, Part 5.

Trieste. La Società Adriatica di Scienze Naturali in Trieste,—Bollettino, Tome XI.

Turin. La R. Accademia delle Scienze di Torino,—Atti, Vol. XXIV, Dispensa 8ª—10.

———. La Osservatorio della Regia Università di Torino,—Bollettino. Anno XXII, 1887.

Vienna. Der K. K. Géologischen Reichsanstalt,—Verhandlungen, Nrn 4—6.

Yokohama. Der Deutschen Gesellschaft für Natur-und Völkerkunde Ostasiens in Tokio,—Mittheilungen, Band V, Heft 41 und supplement-heft zu Band V.

Zagreb. Arkeologickoga Druztva,—Viestnik,—Godina XI, Br. 2.

## Books and Pamphlets,

*presented by the Authors, Translators, &c.*

Elson, S. R. Prospectus and Plan of Elson's maritime Code of Signals, with specimen pages and plate of Flags. 8vo. Calcutta, 1889.

Hatter, H. H. Victorian Year-book for 1887-88, Vol. III. 8vo. Melbourne, 1888.

Murdoch, J., LL. D. Papers on Indian Reform: Sanitary, Material, Social, Moral and Religious. 8vo. Madras, 1889.

## Miscellaneous Presentations.

Ethnologische Mitteilungen aus ungarn, Jahrgang I, Heft 2. 4to. Budapest, 1888.

Magyar Tudományos Akadémiai Almanach, 1888. 8vo. Budapest, 1887.

E. T. Atkinson, Esq.

Dagh-Register gehonden int Easteel Batavia vant passerende daer ter plaetse als over geheel Nederlandts-India, Anno 1659. Van Mr. J. A. Van Der Chijs. 8vo. Batavia, 1889.

Bataviaasch Genootschap van Kunsten en Wetenschappen.

Report of the Fifty-eighth meeting of the British Association for the advancement of Science, held at Bath in September, 1888. 8vo. London, 1889.

British Association for the advancement of Science.

Notes on the Annual Statements of the Government Charitable Dispensaries in the Central Provinces for the year 1888. Fcp. Nagpur, 1889.

Report on the Judicial Administration (Civil) of the Central Provinces for the year 1888. Fcp. Nagpur, 1889.

Resolution on the Revenue Administration of the Central Provinces for the year 1887-88. Fcp. Nagpur, 1889.

Returns of Rail-borne Traffic of the Central Provinces for the quarter ending the 31st of December, 1888. Fcp. Nagpur, 1889.

CHIEF COMMISSIONER, CENTRAL PROVINCES.

Report of the Central Park Menagerie, New York, for the year 1888. 8vo. New York.

WILLIAM A. CONKLIN, ESQ.

The Indian Forester, April 1889. 8vo. Roorkee, 1889.

GOVERNMENT OF BENGAL.

Magnetical and Meteorological observations made at the Government Observatory, Bombay in the year 1887. 4to. Bombay, 1889.

GOVERNMENT OF BOMBAY.

Die Hymnen des Rigveda. Von Hermann Oldenberg. Band I, Metrische und textgeschichtliche Prolegomena. 8vo. Berlin, 1888.

Extracts from a Journal kept by Mr. W. J. Archer, acting British Vice-Consul at Chiengmai, of a visit to Chiengtung in May and June, 1888. Fcp. London, 1889.

Return of all Loans raised in India, chargeable on the Revenues of India, outstanding at the Commencement of the Half-year ended on the 30th September, 1888. Fcp. London, 1889.

GOVERNMENT OF INDIA, HOME DEPARTMENT.

Annual Administration Reports of the Forest Department (Southern and Northern Circles), Madras Presidency, for the official year 1887-88. Fcp. Madras, 1888.

Progress Report of Dr. E. Hultzsch, Epigraphist, on the Archæological Survey of Southern India for the months of February and March, 1889. Fcp. Madras, 1889.

Progress Report of Mr. A. Rea, on the Madras Archæological Survey for the months of December 1888 and January to March 1889. Fcp. Madras, 1889.

GOVERNMENT OF MADRAS.

Twelve maps belonging to the Karnal Settlement Report by D. C. J. Ibbetson, Esq., C. S. Sheets.

GOVERNMENT OF THE PUNJAB.

A Catalogue of the Moths of India, compiled by E. C. Cotes and Colonel C. Swinhoe. Part IV, Geometrites. Part V, Pyrales. Part VI, Crambites, Tortrices, and Addenda. 8vo. Calcutta, 1889.

INDIAN MUSEUM.

Map of Sikkim prepared and used by the Tibetan Military authorities during the campaign in 1886 (Reduced to half scale by Photography

from the original, and Lithographed at the Survey of India office.) Sheet. Calcutta, 1889.

LT.-COL. J. WATERHOUSE, B. S. C.

## PERIODICALS PURCHASED.

Calcutta. Indian Medical Gazette,—Vol. XXIV, Nos. 4 and 5, April and May, 1889.

Ceylon. The Orientalist,—Vol. I, Parts 1—12; Vol. II, Parts 1—12; and Vol. III, Parts 1—10.

Geneva. Archives des Sciences Physiques et Naturelles,—Tome XXI, No. 4.

Leipzig. Annalen der Physik und Chemie,—Band XXXVII, Heft 1, und Namen Register, Band I—XXXV.

London. The Chemical News,—Vol. LIX, Nos. 1534—1538.

———-. The Nineteenth Century,—Vol. XXV, No. 147, May, 1889.

———-. The Society of Arts,—Journal, Vol. XXXVII, Nos. 1900—1904.

Paris. Revue Scientifique,—Tome XLIII, Nos. 15—18.

Vienna. Vienna Oriental Journal,—Vol. III, No. 1.

## BOOKS PURCHASED.

English and Tamil Dictionary. 3rd Edition. 8vo. Madras, 1888.

SEEBOHM, HENRY. The Geographical Distribution of the family *Charadriidæ*, or the Plovers, Sandpipers, Snipes, and their allies. 4to. London, 1888.

# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

## For July, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 3rd July 1889, at 9-15 P. M.

Colonel J. Waterhouse, President, in the Chair.

The following members were present:

Rev. A. W. Atkinson, R. R. Bayne, Esq., Dr. A. Crombie, S. R. Elson, Esq., Bábú Bhupendra Sri Ghosha, Dr. Hoernle, W. H. Jobbins, Esq., E. J. Jones, Esq., Dr. W. King, Rev. Father Lafont, C. Little, Esq., Kumár Rameswár Máliah, T. R. Munro, Esq., Bábú Asutosh Mukhopádhyáy, L. de Nicéville, Esq., Dr. P. K. Ray, Capt. J. Hayes Sadler, W. L. Sclater, Esq., Dr. J. Scully, J. Wood-Mason, Esq.

Visitors:—Dr. J. R. Adie, B. W. Colville, Esq., J. D. Nimmo, Esq., Hon. Mr. Justice Tottenham, W. H. Wood, Esq.

The Minutes of the last meeting were read and confirmed.

Thirty-four presentations were announced, details of which are given in the Library List appended.

The following gentleman, duly proposed and seconded at the last meeting of the Society, was ballotted for, and elected an Ordinary Member:

Lala Brij Bhukhan Lal.

The following gentleman has expressed a wish to withdraw from the Society:

F. R. Mallet, Esq.

The SECRETARY reported the death of the following members :

*Ordinary.*

Mahárájá Isvariprasád Singh, G. C. S. I. of Benares.
Dr. D. Waldie.

*Honorary.*

Professor William Wright, Cambridge.

The PRESIDENT said:—I very much regret to have to announce the death since our last meeting of Dr. D. Waldie, one of our oldest members of Council. Dr. Waldie joined the Society in 1865 and had served on the Council since 1879, having been Vice-President in the years 1884 and 1885. He was a most regular attendant at our meetings, and was always ready to further the work of the Society in auditing accounts and giving his services on the various Committees.

He published several papers in the *Journal* and *Proceedings*, most of which were connected with the Water-supply of Calcutta and the effective filtration of the Hooghly water during the rainy season, which has always been a difficulty.

Before Dr. Waldie came to India some forty years ago, he had been connected with Sir James Simpson, who was the first to apply sulphuric ether as an anæsthetic, and appears to have suggested to him the use of chloroform instead of ether, though our late friend and associate does not seem to have received full credit for his share in one of the most important discoveries of the age.

A man of retiring and unassuming ways, we here had few opportunities of knowing the full extent of his scientific work, but as an analytical chemist and chemical manufacturer he undoubtedly did much to promote chemical science in this country. I believe he also did good service in connection with the establishment of Libraries and Institutes in the neighbourhood of his works at Cossipore and Dakhinsur. We shall miss his kindly presence here, and he will be regretted by many who knew his worth.

DR. W. KING exhibited some specimens of interesting minerals.

The SECRETARY gave a summary of the observations received from different sources regarding the explosive sounds known as the "Barisál Guns" and showed how the theory, suggested by Mr. Manson, that they are echoes, explains many peculiarities observed in connection with these sounds.

The following papers were read—

1. *On certain* Lycænidæ *from Lower Tenasserim.—By* WM. DOHERTY ESQ., *Cincinnati, U. S. A. Communicated by the* SUPERINTENDENT OF THE INDIAN MUSEUM.

Mr. de Nice'ville made the following remarks :—

The members present will have noted that this paper deals with one family only of the butterflies. Mr. Doherty took up the butterflies of this group so that the species new to science that he described might be included in my "Butterflies of India, Burmah and Ceylon;" the third volume of which, dealing with the *Lycænidæ*, is now passing through the press.

Mr. Doherty's list gives over 100 species of *Lycænidæ*, and he says that Lower Tenasserim probably possesses twice that number; in this I agree with him, as his list omits many common species which have often been obtained in Burmah, and are sure to occur in the region Mr. Doherty visited.

In 1886, Mr. Doherty proposed the subfamily of *Amblypodinæ* of the *Lycænidæ*, but in this paper he proposes to alter the name to *Arhopalinæ*. If this subfamily is to stand, I think it would be as well to let his first proposed name remain, as it is derived from by far the better-known genus of the two.

Mr. Doherty's notes on green butterflies are most interesting. As far as my experience goes, it coincides with his that those *Lycænidæ* which are of a rich glistening metallic green colour on the upperside are invariably males. The green coloration of the undersides of such butterflies as the European "Green Hairstreak," *Thecla rubi*, Linnæus, and the Indian *Lehera eryx*, Linnæus, is undoubtedly protective, these insects being very difficult to see when at rest with closed wings on green leaves. This green colour, too, occurs in both sexes, while the metallic-green coloration is found in the *Lycænidæ* in males only.

Mr. Doherty is to be congratulated on the success of his trip to Lower Tenasserim, as in one family of Butterflies alone he has added fifteen species new to science. Such a high percentage (fifteen) is not often obtained now-a-days in the best-known sub-order of insects.

2. *Materials for a Flora of the Malayan Peninsula.—By* George King, M. B., LL. D., F. R. S., F. L. S., *Superintendent of the Royal Botanic Garden, Calcutta.*

As the Calcutta Herbarium contains a rich collection of Malayan plants, I propose to publish from time to time a systematic account of as many of them as are indigenous to British provinces, or to provinces under British influence. In addition to the states on the mainland of the Malayan Peninsula, these provinces include the islands of Singapore and Penang and the Nicobar and Andaman groups. The classification which I propose to follow is that of the late Mr. Bentham and Sir Joseph Hooker. It is unlikely that, with the scanty leisure at my command, I shall

be able to complete even the meagre account of the Flora of which the first instalment is now submitted. In spite, however, of this consideration, I think it better to begin at the beginning. The orders will therefore be taken up pretty nearly in the sequence followed in the *Genera Plantarum* of Bentham and Hooker, and in the *Flora of British India* of the latter distinguished botanist. The natural orders now snbmitted are *Ranunculaceæ*, *Dilleniaceæ*, *Magnoliaceæ*, *Menispermaceæ*, *Nymphœaceæ*, *Capparideæ*, *and Violareæ*. The order *Anonaceæ* should have come between *Magnoliaceæ* and *Menispermaceæ;* but, on account of its extent and difficulty, I have been obliged to postpone its elaboration pending the receipt of further herbarium material. It will, however, it is hoped, soon be taken up.

The papers will be published in full in the Journal, Part II.

## LIBRARY.

The following additions have been made to the Library since the meeting held in June last.

### TRANSACTIONS, PROCEEDINGS AND JOURNALS,

*presented by the respective Societies and Editors.*

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Brussels. La Société Royale Malacologique de Belgique,—Annales, Tome XXII.

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Danzig. Der Naturforschenden Gesellschaft in Danzig,—Schriften, Neue Folge, Bandes VII, Heft 2.

Edinburgh. The Scottish Geographical Society,—Magazine, Vol. V, Nos. 3-5, March-May, 1889.

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———. Institution of Electrical Engineers,—Journal, Vol. XVIII, No. 80.

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Paris. La Société dé Géographie,—Compte Rendu des Séances, Nos. 8-10, 1889.

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Pisa. La Società Toscana di Scienze Naturali,—Atti (Processi Verbali) Vol. VI, Gennaio 1889.

Rio de Janeiro. Imperial Observatorio do Rio de Janeiro,—Revista do Observatorio, Vol. IV, No. 3.

Rome. La Società Degli Spettroscopisti Italiani,—Memorie, Vol. XVIII, Disp. 4ª.

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ROY, PRATAP CHANDRA, C. I. E. The Mahábhárata, translated into English prose. Part XLIX. 8vo. Calcutta, 1889.

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Thirty-first Annual Report of the Trade and Commerce of Chicago, for the year ended December 31st, 1888. 8vo. Chicago, 1889.

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Catalogue of the Fossil Cephalopoda in the British Museum (Natural History). Part I. Containing part of the sub-order Nautiloidea. By Arthur H. Foord, F. G. S. 8vo. London, 1888.

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Report on the Lunatic Asylums of the Central Provinces for the year 1888. Fcp. Nagpur, 1889.

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Administration Report on the Jails of Bengal for the year 1888. Fcp. Calcutta, 1889.

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Reports of the Alipore and Hazaribagh Reformatory Schools for the year 1888. Fcp. Calcutta, 1889.

GOVERNMENT OF BENGAL.

Alberuni's India, an English edition, with notes and indices. By Dr. Edward C. Sachau. 2 volumes, (Trübner's Oriental Series). 8vo. London, 1888.

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A List of ancient mounds in the Kistna district which are supposed to contain buildings or other objects of archæological interest. Fcp. Madras 1889.

South Indian Chronological tables, by the late W. S. Krishnasvami Naidu, edited by Robert Sewell, M. C. S. 4to. Madras, 1889.

GOVERNMENT OF MADRAS.

A catalogue of the Mantodea, with descriptions of new genera and species, and an enumeration of the specimens in the collection of the Indian Museum, Calcutta. By J. Wood-Mason. 8vo. Calcutta, 1889.

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Göttingen. Der Königl. Gesellschaft der Wissenschaften,—Göttingische Gelehrte Anzeigen, Nrn. 5—9, 1889.

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Savignhac and Pearson, Messrs. Asiatic Museum illustrated. Part I comprising figures of all the models that were presented to the Museum by Miss Tytler, making a total of eighty-three, to which is added a Portrait of Sir W. Jones, Founder of the Asiatic Society, and a view of the Society's apartments in Chowringhee. Oblong. Calcutta, 1828.

Selections from unpublished Records of Government for the years 1748 to 1767 inclusive, relating mainly to the social condition of Bengal, with a map of Calcutta in 1764. By the Rev. J. Long, vol. I. 8vo. Calcutta, 1869.

Selections from Calcutta Gazettes of the years 1784, 1785, 1786, 1787 and 1788, showing the political and social condition of the English in India eighty years ago. By W. S. Seton-Karr, C. S., vol. I. 8vo. Calcutta, 1864.

Selections from Calcutta Gazettes of the years 1789, 1790, 1791, 1792, 1793, 1794, 1795, 1796 and 1797, showing the political and social condition of the English in India seventy years ago. By W. S. Seton-Karr, C. S., vol. II. 8vo. Calcutta, 1865.

Selections from Calcutta Gazettes of the years 1816 to 1823 inclusive, showing the political and social condition of the English in India, fifty years ago. By Hugh David Sandeman, C. S. vol. V. 8vo, Calcutta, 1869.

Stainton, H. T., F. R. S. The Larvæ of the British Butterflies and Moths, by the late William Buckler. Vol. III, concluding portion of the Bombyces. (Ray Society). 8vo. London, 1889.

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# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

FOR AUGUST, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 7th August 1889, at 9-15 P. M.

E. T. ATKINSON, ESQ., Vice-President, in the Chair.

The following Members were present:

Dr. A. W. Alcock, R. R. Bayne, Esq, H. Beveridge, Esq., Bábú Gaurdás Bysack, Bábú Saratchandra Dás, Dr. Fritz Noetling, Bábú Bupendra Sri Ghosha, Bábú Rajánikánta Gupta, Dr. Hoernle, A. Hogg, Esq., W. H. Jobbins, Esq., E. J. Jones, Esq., C. Little, Esq., Kumár Rameswár Maliáh, W. H. Miles, Esq., Bábú Asutosh Mukhopádhyáy, T. R. Munro, Esq., L. de Nicéville, Esq., W. L. Sclater, Esq., Bábú Hiralal Sen, Pandit Haraprasád Shástri, Dr. W. J. Simpson, C. H. Tawney, Esq., J. Wood-Mason, Esq.

The Minutes of the last Meeting were read and confirmed.

Thirty-nine presentations were announced, details of which are given in the Library List appended.

The following gentlemen are candidates for election at the next meeting:

John Duncan Nimmo, Esq., proposed by T. R. Munro, Esq., seconded by W. R. Criper, Esq.

Munshi Aziz-ud-din Ahmad, Deputy Collector, N. W. P., proposed by V. A. Smith, Esq., seconded by Dr. Hoernle.

H. H. the Máharájá of Benares, Prabhunarain Sing, Bahádur, proposed by Bábú Gaurdás Bysack, seconded by Col. Waterhouse.

The SECRETARY reported the death of the following member:
Dr. Francis Day.

Dr. Hoernle exhibited a large silver seal of Kumára Gupta, found at Bhitarí and forwarded by Mr. J. Nicholls, C. S., and read the following abstract from his letter referring to it :—

"The seal was dug up in 1885 when digging for those old bricks of great size which so frequently occur at Bhitarí. They were wanted for use in some new buildings. I think these are of the sort of bricks which Cunningham says are often marked with the name Kumára.

"The man who brought me the seal from his father was in Government employ for six years in Gházípur, and for about three years under me as Judge. He was lately turned out, as he had never passed the Middle Class examination, and he came to me for help in his trouble. I think it impossible for him or any of his people to have attempted an imposition. My father-in-law, Mr. Richard Tregear, has known these people and had business with them for very many years. They always grow indigo for his factory and are respectable people."

Dr. Hoernle observed that the seal had been announced as one of silver, but it was more correct to describe it as a copper seal, because from an assay, made by Dr. Scully, it appeared that the metal contained about 63 per cent. of copper to 36 per cent. of silver. There was also a very small quantity of gold in the mixture. The characters, as usual on such seals, were slightly raised, while on copperplate grants they were usually engraved. In all probability the seal had once belonged to a copperplate grant; but it differed from other seals, in that it appeared to have been soldered on to the plate by the two knobs on its back; while usually the seals were attached to the plate by means of a sliding ring passing through a hole in the plate. There were only three other seals like the present one known: a copper one of Harsha Vardhana, which was a little larger, another of Śarva Varman, of about the same size, and a third of Samudra Gupta, of about half the size. The characters of the inscription belonged to the North Indian class of alphabets; and the inscription was in a fairly good state of preservation. This was a most fortunate circumstance, as the inscription was one of very considerable importance. It carried the genealogy of the early Gupta dynasty two generations further than in any record hitherto known. The line was given thus: 1, Gupta, 2, his son Ghaṭotkacha, 3, his son Chandra Gupta I., 4, his son Samudra Gupta, 5, his son Chandra Gupta II., 6, his son Kumára Gupta I., 7, his son Pura Gupta; 8, his son Narasiṃha Gupta; 9, his son Kumára Gupta II. It was distinctly stated that the series ran from father to son in every case. The list contained three new names, *viz.*, Pura, Narasiṃha and Kumára II., while all the other names were the same as those given in all Gupta genealogies hitherto found. The difficulty, however, was that the genealogies hitherto known, gave

seven names also running from father to son: Gupta, Ghaṭotkacha, Chandra I., Samudra, Chandra II., Kumára and Skanda. In the place of the seventh name Skanda Gupta, the new list gave Pura Gupta. The question was in what relation Skanda Gupta stood to Pura Gupta. Were they identical, or perhaps brothers? There was another important piece of information in the new list; it mentioned by name the queens of every king, except the two first and the last. Their names were: 1, Kumára Deví, queen of Chandra Gupta I., 2, Datta Deví, queen of Samudra Gupta, 3, Dhruva Deví, queen of Chandra Gupta II., 4, Ananta Deví, queen of Kumára Gupta I., 5, Śrivatsa Deví, queen of Pura Gupta, 6, Śrímatí Deví, queen of Narasiṃha Gupta. The older genealogies only mentioned three of these names, *viz.*, Kumára, Datta and Dhruva. The queen of Kumára Gupta I. and mother of Skanda Gupta was never named, though she was referred to in them. The queen of Skanda Gupta was never mentioned at all, whether by name or otherwise. Among the older genealogies, there were only two that carried the line down to the seventh generation of Skanda Gupta. These were the genealogy recorded on the Bhitarí stone pillar, and another, in a greatly mutilated state, on the Bihár stone pillar. The former mentioned that Skanda Gupta, after having restored the fallen fortunes of his empire, reported his victories to his mother. The latter mentioned that his father Kumára Gupta married the sister of a person who appears to have been named Ananta Sena. Unfortunately that inscription was in a too bad state of mutilation to place any reliance on it. But if Kumára Gupta's wife's brother was named Ananta Sena, the sister herself would very probably have borne the name of Ananta Deví, by which name Kumára Gupta I's queen is called in the new genealogy. In that case the probability was either that Pura Gupta was identical with Skanda Gupta, or that he was a younger brother of Skanda Gupta, and succeeded the latter, who probably died without issue, there being no indication of his wife's name or existence. In any case the present seal seemed to prove that the line of the early Guptas did not, as was hitherto generally assumed, terminate with Skanda Gupta, but extended to at least two more generations. Hitherto it was supposed that there was only one Kumára Gupta; and the appearance of a second Kumára Gupta would perhaps necessitate a reconsideration of certain historical speculations based on the assumption that there was only one member of that name in the early line of Guptas. Curiously enough there was some independent evidence for the existence of a king Narasiṃha Gupta. Among the gold coins, belonging to the class of the early Gupta coins, there were some which bore the name of Nara or Nara Gupta. Hitherto these coins had been a puzzle; they resembled very closely the coins of the

known Guptas, yet there was no member of the Gupta dynasty known by the name of Nara. It seemed clear now, that these coins must be attributed to the Narasiṃha Gupta of the new seal. There was another variety of similar coins, which could not hitherto be satisfactorily attributed. They showed, after the manner of the Gupta coins, on the reverse the title of *Prakáśáditya*, but the proper name of the king was not preserved on any of the specimens hitherto found. On the other hand, it was impossible to attribute them to any of the hitherto known members of the Early Gupta dynasty. The suggestion was that they were coins of Pura Gupta, or perhaps of Kumára Gupta II. There could be no doubt as to the existence of the three new names on the seal. The names of Pura and Narasiṃha were distinctly legible; that of Kumára II. was less distinct, but sufficient for identification. The names of the queens S'rívatsa and S'rímatí were unfortunately less distinct. Of the former *S'rí Va* was quite clear, but *tsa* was almost illegible; of the latter, *S'ríma* was fairly distinct, but *tí* was doubtful. One more point deserved a passing notice, *viz.*, the uniform use of the *upadhmaníya* and the assimilation of the visarga to a succeeding sibilant. The following was a transcript and translation of the inscription.

१, सर्व्वराजोच्छेत्तुर्पृथिव्यामप्रतिरथस्य महाराजश्रीगुप्तप्रपौत्रस्य महाराजश्रीघटोत्कचपौत्रस्य महा-

२, राजाधिराजश्रीचन्द्रगुप्तपुत्रस्य लिच्छविदौहित्रस्य महादेव्यां कुमारदेव्यामुत्पन्नस्य महाराजाधिराज-

३, श्रीसमुद्रगुप्तस्य पुत्रस्तत्परिगृहीतो महादेव्यान्दत्तदेव्यामुत्पन्नस्स्वयं चाप्रतिरथपैरमभाग-

४, वतो महाराजाधिराजश्रीचन्द्रगुप्तस्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां ध्रुवदेव्यामुत्पन्नो महारा-

५, जाधिराजश्रीकुमारगुप्तस्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यामनन्तदेव्यामुत्पन्नो महारा-

६, जाधिराजश्रीपुरगुप्तस्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां श्रीवत्सदेव्यामुत्पन्नो महा-

७, राजाधिराजश्रीनरसिंहगुप्तस्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां श्रीमतीदे-

८, व्यामुत्पन्नपैरमभागवतो महाराजाधिराजश्रीकुमारगुप्तः ॥

(Lines 1 and 2.)*—The son of the Mahárájádhirája, the glorious **Samudra-Gupta,** who was the exterminator of all kings; who had no antagonist (*of equal power*) in the world; who was the son of the son's son of the Mahárája, the illustrious **Gupta;** who was the son's son of the Mahárája, the illustrious **Ghaṭotkacha;** (*and*) who was the son of the

* I follow Mr. Fleet's translation (*Corpus Inscriptionum Indicarum*, Vol. III, p. 54) as far as it goes.

Mahárájádhirája, the glorious **Chandragupta** (I.), (*and*) the daughter's son of Lichchhavi, begotten on the Mahádeví KUMÁRADEVÍ,

(Line 3.)—(*was*) the most devout worshipper of the Divine One, the Mahárájádhirája, the glorious **Chandragupta** (II.), who was accepted by him (*i. e., Samudragupta*); who was begotten on the Mahádeví DATTADEVÍ; and who was himself without an antagonist (*of equal power*).*

(Line 4.)—His son (*was*) the Mahárájádhirája, the glorious **Kumáragupta** (I.), who meditated on his feet, (*and*) who was begotten on the Mahádeví DHRUVADEVÍ.

(Line 5.)—His son (*was*) the Mahárájádhirája, the glorious **Pura-**

To be substituted for the corresponding pages in the Proceedings for August 1889.

1.—Report on 372 old copper coins, forwarded by the Deputy Commissioner of Jabalpur with his No. 4783, dated 8th December, 1887.

The find place is not specified. It must have been somewhere in the Jabalpur district.

All the coins belong to Ḥusámu-d-dín Húshang Sháh, the second of the kings of Málwa and Mándú. They are described by Thomas in his *Chronicles of the Pathán Kings of Delhi*, p. 348. They are small copper coins, having on the obverse *Húshang Sháh as-Sulṭán*, and on the reverse: Dáru-l-Mulk Shádíábád. They bear no date.

2.—Report on 24 ancient silver coins, forwarded by the Collector of Champáran, with his No. 1119 G, dated 20th February 1889:

On or about the 5th July 1887, a Kúli Dusádh of Kundilpur found a hoard of buried silver coins, which is supposed to have amounted to about Rs. 500 or Rs. 600, but of which only Rs. 124 were recoverd. On the 20th January 1889, 24 of the best preserved specimens were forwarded to me for examination, while the remainder were returned

* Or, "who was himself an antagonist (*of equal power to all his enemies*)," if we read *svayaṃ cha pratirathaḥ*.

by the Collector to the finder under the orders of Government (see Collector's No. 156 G, dated 3rd May 1889).

All the 24 specimens are Rupees of the Paṭhán Sulṭán 'Aláu-d-dín Muḥammad Sháh, who reigned from A. H. 695-715 = A. D. 1295-1315. The remainder are stated (in Collector's letter No. 51 G, dated 13th August 1888) to have been identical in appearance. It may be presumed, therefore, that all the coins of the hoard were Rupees of the same type of the same Sulṭán. The type is that described and figured in E. Thomas' *Chronicles of the Pathán kings of Delhi*, p. 171, Nos. 133 and 134, plate III, fig. 57. In most of the 24 specimens, the margin is entirely or almost entirely cut away; accordingly neither the place nor the year of mint can be determined. In 9 specimens, however, traces of the mint place *Dáru-l-Islám* (*i. e.*, Dehlí), and in two others, of *Ḥaṣrat Dehlí*, can be distinguished. Two specimens also preserve traces of the dates 711 and 713.

3.—Report on 89 ancient coins, forwarded by the Deputy Commissioner of Rawalpindi, with his No. 847 G, dated the 25th March, 1889.

The coins are stated to have been dug up by a zemindar, in June 1888, near Hasan Abdal, in land held by him in joint-ownership.

They all belong to the well-known "Bull and Horseman" type of silver coins of the Brahmanic kingdom of Kabul. They have been often found in large quantities, and described and figured; *e. g.*, in Wilson's *Ariana Antiqua*, Plate XIX, fig. 1-5, Prinsep's *Indian Antiquities* (ed. Thomas), Plate XXV, fig. 3-5, etc. They show on the obverse a mounted warrior with the legend *Bhīma* and the date 814; and on the reverse a recumbent Brahmaní Bull with the legend *Srí Samanta Deva* (82 specimens) or *Srí Syalpati Deva* (7 sp.). The date 814 is most probably referable to the Saka era, and therefore equivalent to 891-892 A. D.

The average weight of each coin is 47·55 grains. One specimen has been, in kind response to my request, assayed by the Assistant Mint Master, Dr. J. Scully, with the following result. The fineness is silver 894, 6 per mille; the only other metals entering into the composition of the coins being copper and a very small amount of gold. The intrinsic value of each coin, derived from weight and fineness, is 4 annas $1\frac{1}{2}$ pie. The modern four-anna piece weighs 45 grains and has a fineness of 916·6 per mille; so the lower fineness of the ancient coin is more than compensated by its superior weight.

Twenty-five of the coins are in bad preservation; the remainder are more or less fairly preserved: on 23 of the latter the date is legible.

The Secretary laid before the Meeting the report of the "Barisál Guns" Sub-Committee.

*Report on 'Barisál Guns' made at a meeting of the Sub-Committee held on the 17th July* 1889, *to consider the observations recorded during the year* 1888.

*Present:*

Colonel Waterhouse.
Rev. Father Lafont.
A. Pedler, Esq.
Babu Gaurdás Bysack.
C. Little, Esq.

The reports sent by correspondents have been partly by means of the forms sent out by the Sub-Committee, partly by letters. Fifteen forms were filled up and returned, and the information contained is given in the accompanying table, in which the more important facts are entered. The dates on the forms are from April 28th to August 14th, 1888 and March 11th, 1889. A large proportion come from Khulna and Barisál, the other places being Moyapore (1), Narainganj (1), Noakhalli (2), Harispur (1), and Daulat, six miles north of Khulna (1). Dr. Crawford sent 5 from Barisál, Mr. Rainey 2 from Khulna, and the facts supplied by Mr. Waller were observed at Khulna by himself or in neighbouring districts by his subordinates. None of these forms or letters refer to the same day, except two cases on the 16th of July and the 14th of August, but the sounds were not heard at the same hours and frequently there are considerable gaps between consecutive dates: this fact, however, may go to shew that these sounds are heard at isolated places and not over a tract of country. This is suggested by the sounds being heard frequently by Mr. Waller in June, and not by Mr. Rainey till the 2nd or 3rd of July, though they were both in Khulna and lived not very far apart.

In all of these forms cloudy or rainy weather is reported, both at the time the sounds were heard and during the previous 24 hours. On this point there is almost complete unanimity.

The only information to be drawn from the reported directions of the sounds is that they always come from a southerly direction, the only exception to this being Kutubdia Light House, and then the sound came from the north-west, while the wind direction was almost due opposite. From Dr. Crawford's and Mr. Rainey's reports it seems that the sounds generally come from the same direction to any given place, and this direction does not alter with a change of wind. During the first two days on which Dr. Crawford reports, the wind was blowing lightly from the S. E. and the sounds came from S. S. E., the second day a little more southerly: during the last three days a strong wind was blowing from the S. W., but the directions of the sounds remained unchanged.

Mr. Rainey reports that the sounds come always from a south-westerly direction, from the direction of the river. If the other observers had repeated their observations, and given information as to the position of the river from where the sounds were heard, this connection might have been more thoroughly established. The other points referred to in the reports are the electrical disturbance and state of the tides. The existence of the former, near or at a distance, is negatived by all observers except Messrs. Crawford, Rainey and Elson. Mr. Elson reports the sounds heard by him at Moyapore on the 29th April, five hours after a nor'wester had passed over. The sound of thunder died away in the distance, and some time afterwards the 'guns' became audible. He considers them due to thunder in the distance. Mr. Rainey says thunder and bombs were heard before and after the 'guns' he reports, but the thunder came from the S. E. while the 'guns' were from the S. W. The tide is in the majority of cases reported as full, but sometimes half full and low tide.

The more important letters have been sent by Messrs. Manson and Waller. The former writes of what was observed by him ten or twelve years ago, and after shewing that the banks of the river have the power of concentrating sounds so that echoes may be heard after passing over 50 to 100 miles, he enumerates various sounds loud enough to produce these echoes. The more frequent sounds arise from breaking surf, falling of banks, and bombs. He suggests at the end of his letter that the sounds are echoes which are audible over a limited area, very near the focus in which the sound rays are more or less accurately concentrated.

Mr. Waller has confined his attention more to the number of sounds heard from day to day, and the hours at which they occurred. In the official report sent by him to the Bengal Government, he has summarised his observations and sent along with it a table containing the number of sounds heard in his district, arranged according to the day and hour they were heard. In the table, which extended from the middle of July to about the end of August, the numbers are very large for four days about the middle of August. More sounds were heard during those days than all the other days together. In some of his letters sent to the Society he reports that the guns were very numerous just before the breaking of the monsoon on the 27th of June, and again on 14th July.

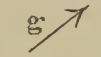
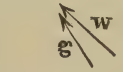
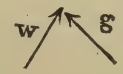
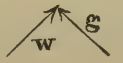
These three occasions of Mr. Waller's hearing an unusual number of 'guns' agree very closely with the occurrence of disturbed weather at the head of the Bay, accompanied, as shown by the daily weather report from the Mutla light ship, by a heavy swell and consequently heavy breakers at the mouths of the rivers. It is also noticeable that

the sounds are heard during the period of calm weather, while the centre of disturbance is still at a considerable distance, and that they almost entirely cease after the strong winds and stormy weather commence.

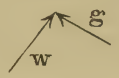
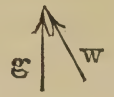
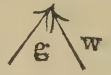
A few other letters of less importance have been received. Mr. D. Ross, of Sultanpur, Purneah, mentions that these sounds, though heard with startling distinctness in a calm evening, were not followed by echoes, though a gun-shot echoed and re-echoed among the neighbouring hills. Mr. M. Punchard, who, while commander of a river steamer had heard the sounds frequently, gives a strong opinion against their being caused by the falling of river banks or the explosion of bombs: his reason for the latter being that he has heard the sounds 'where human habitations are unknown.' Commander Jones of the S. S. "Resolute" reports hearing sounds of distant firing to the S. E. on September 15th, 1888 about 10·30 P. M. There was no thunder, but slight sheet lightning to the N. E. Mr. La Touche, of the Geological Survey, writes that he heard similar sounds in the Khasia hills on the edge of the plateau about 14 miles to the west of Cherrapoonjee, close to the village of Kengsao, on the 19th March between 5 and 6 P. M. from W. S. W., generally two in quick succession, short, low booms occurring 3 or 4 times. Later, about 8 P. M., a thunderstorm passed to the north, but not from the same direction as the other sounds.

After consideration of these reports we are almost unanimously of opinion that the evidence is very strongly in favour of the sounds being closely connected with the river banks, and that their frequent occurrence during two or three days immediately preceding the arrival of disturbed weather from the Bay of Bengal may be attributed to the atmosphere being highly charged with moisture, and the comparatively calm weather which occurs at such times. We have carefully considered the evidence in favour of the theory of echoes from the river banks suggested by Mr. Manson, and supported as it is by strong circumstantial evidence, in that it readily explains many peculiarities noticed in connection with these sounds, we think, it at least deserves, that efforts should be made to disprove it. There seems to be no evidence in favour of volcanic action, or the 'Swash of no-ground" being the causes of the sounds, and we are of opinion that by gradually narrowing the field of enquiry in this way the arrival at results may be more readily effected.

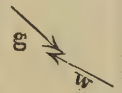
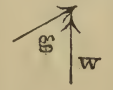
Babu Gaurdas Bysack, while dissenting from the expression of opinion that the sounds are due in some way to the river banks, wishes it to be recorded that his reason for so doing is because of the existence of similar banks in other parts of the Ganges near which no such sounds are ever heard.

| | Station. | Date. | Direction of sound. Direction of wind. | State of weather at time of observation. | State of weather previous 24 hours. | Was thunder observed. | State of tide. | |
|---|---|---|---|---|---|---|---|---|
| 1 | | 1888 |  | | After falling of rain | | | |
| 2 | Moyapore | 29th April | | Heavy nor'wester 5 hours before | Fine except storm | During storm | Tide high, last quarter ebb | |
| 3 | Kutubdia Light House | 8th and 11th June |  | Cloudy | 1st time cloudy 2nd time cloud and rain | No | 1st time ebb tide 2nd time flood tide | |
| 4 | Barisal | 16th June | | Sky covered with light cloud | A few drops of rain fell on morning 15th and heavy cloud which cleared away | — | Just full, commencing to ebb | |
| 5 | Ditto | 18th June |  | Light cloud | Cloudy most of the day, clear in the morning | Not for a week before ; a little thunder to S. W. distant about 10 P. M. Sounds heard 7-40 P. M. | Half full | |
| 6 | Ditto | 22nd June] |  | Cloudy | Cloudy—Very hot preceding night | No | Ebbing, nearly full | |

The arrow marked 'w' gives direction of wind.
„ g „ sound.

| | Station. | Date. | Direction of sound. Direction of wind. | State of weather at time of observation. | State of weather previous 24 hours. | Was thunder observed. | State of tide. | |
|---|---|---|---|---|---|---|---|---|
| 7 | Barisal | 1888 23rd June |   | Cloudy | Cloudy and hot | Heard there was thunder S. or S. W. during night 22/23. Did not hear himself | Nearly full | |
| 8 | Ditto | 24th June |   | Cloudy | Cloudy, no rain | No | Sounds heard at 2, 4 and 6-15 P. M. Tide full at 6 P. M. | |
| 9 | Naraingunj | 25th June |   | Cloudy | Cloudless, very hot | No | Tide full | |
| 10 | Khulna | 3rd July | | Cloudy, dense and humid | Cloudy, with rain occasionally. Thunder frequently heard | Rumbling sounds of thunder from S. E. shortly before and bombs | Rising tide | |
| 11 | Noakhally | 5th July | | Cloudy | Hot | No | — | |
| 12 | Khulna | 8th July | | Very cloudy, almost still | Cloudy, dense, humid, light rain | Thunder heard indistinctly from S. E. or S. some time before; Bombs before and after | Ebbing | |

The arrow marked 'w' gives direction of wind.
" g " sound.

| | Station. | Date. | Direction of sound. Direction of wind. | State of weather at time of observation. | State of weather previous 24 hours. | Was thunder observed. | State of tide. | |
|---|---|---|---|---|---|---|---|---|
| | | 1888 | | | | | | |
| 13 | Daulatpur on River Bhyrub 6 miles north of Khulna | 16th July | | Weather fair, sky clear | Fair and cloudy at times | No | High tide | Sounds frequently heard in cloudy weather with river full |
| 14 | Harispur | 12th and 14th August |   | Light Rain 12th Heavy Rain 14th | Cloudy with rain 11th Cloudy without rain 13th | No | — | |
| | | 1889 | | | | | | |
| 15 | Noakhally | 11th March |   | Clear, no cloud | Clear fine, no rain no cloud | No | Last of the ebb | |

The arrow marked 'w' gives direction of wind.
„ g „ sound.

*Summary of Mr. Waller's observations.*

The general result of observations I made during some 6 weeks of June and July gave the following results

(*a*) the sounds seemed always to come from the south or south-east.

(*b*) they were sometimes single and sometimes double, *i. e.*, like 2 cannons fired immediately after each other;

(*c*) they came sometimes singly at short intervals and sometimes as many as 5 or 6 in quick succession with only a second or two between, while at other times a single sound was heard not followed by another at all that day, or not till after a long time;

(*d*) the sounds were heard indistinctly except in somewhat still weather, hence they were heard more clearly and distinctly at night as a rule than by day;

(*e*) the sounds when loud and distinct could not be mistaken for any other sound, but when indistinct might not be distinguishable from the sounds of bombs;

(*f*) the distinctive characteristic of the sounds was the resounding hollowness of them, resembling the sound of a large heavy substance falling on to a wooden floor in a very large vaulted building heard at a considerable distance;

(*g*) the wind was invariably from the south, or south-east by south, at this time of the year;

(*h*) there was an unusual number of frequent discharges day and night just before the monsoon broke here on June 27th;

(*i*) I noticed 2 or 3 times that when there were a considerable number of the sounds heard, a bank of rain cloud from the south had come up discharging rain within the previous 24 hours;

(*k*) the sky was more or less overcast to the south always;

(*l*) no electrical disturbances or thunder were observed, either locally or at a distance, before or after or at the time of the sounds;

(*m*) the sounds were heard at all states of the ebb and flood tides equally.

The way in which the sounds may be heard by one person and not by another in the same or almost the same place was exemplified by my bearer hearing 3 sounds on my house steps as I rode slowly up to them in the evening, while I, who was not 50 yards off, heard nothing. Mr. Rainey also told me he had heard them while in a house with others, who being in another part of it heard nothing.

From Chanduria, Debhatta and Morrellgunj it is reported that, though heard in former years at those places, none were heard during 1888, and though I heard many at my house at Khulna, Mr. Rainey, whose house is about a quarter of a mile east of Rupsha river, close to which

my house stands, told me he had heard none this year. They were heard, however, at Satkhira, generally in the morning and evening and at quite irregular intervals, and from the east and south-east, and usually while there was light rain falling after a clear sky the previous day. The Municipal Chairman there says he has heard them at Ranaghat in Nuddea, and that Hindu children are taught that the sounds are the opening of the gates of Ravan, king of Lanka.

My own impression is, that the sounds are undoubtedly atmospheric, and caused by some meteorological phenomena resulting from the approach of banks of warm vapour from the Bay of Bengal towards the land, and possibly to their meeting with a cold air current from the north.

*Extract from a letter written by* A. Manson, Esq.

I have heard them at Dacca, in the Noakhali district, on the Meghna, and going through the Sundarbans on one of the Assam steamers, but it is all so long ago that I cannot trust my memory for exact particulars.

I. In Dacca it was in August—October 1875 at night.

II. On the Meghna in October 1875 during the last 4 or 5 days of the month as I was travelling down from Dacca to Noakhali by native boat: and III, afterwards in 1878-79 in some parts of Noakhali district, I cannot say exactly where, nor what time, but I think in the cold weather.

IV. Going through the Sundarbans by steamer from Calcutta to Goalando during the last few days of October 1876 I heard them at Barhaisal itself, and some other occasions I had much talk about them with the steamer Captain, this time (at Barhaisal) it was in the evening, about sunset I think, and the day before the great cyclone which drowned out Soondeep &c., tide about at the full I remember. On that occasion I thought the sounds were possibly native fire-works, "bâns"—but the Captain was convinced they were the genuine "guns." I may say that every time and place where I have heard them there has always been the possibility of native bombs. I have been a good deal about the Meghna in boats and along this sea coast, and can testify that natives are perpetually firing off these 'bâns' at all hours of the day and night. A large joint of bamboo rammed with some pounds of powder, or sometimes a stout earthenware bombshell, is buried in the ground, rammed tight and fired with a fuse just for the sake of the noise, but it is mostly done when crops are reaped and the ground is dry, December to June. The "Guns" are not at all like one of these bombs when heard within a couple of miles, for I know the bombs very well. The "Guns" are more of a dull roar with a reverberation, like a blast in a quarry amongst the hills, or a heavy gun some miles off. I cannot tell the direction of the

sounds, but always had the impression they were from the south—but once I distinctly made out such sounds coming from the falling of the banks. This was on the second occasion above mentioned. I was rowing down with the ebb, I think it was afternoon but the exact place I cannot say; hearing such a sound I went out of the cabin and sat on the roof of the boat with my binoculars watching. I heard the sounds pretty often and found they always followed any considerable fall of the bank when that took place a mile or so from the boat: the bank must have been 20 feet high and many falls were taking place, as usually happens when the ebb is running out. One very large piece fell within a few hundred yards of the boat, and there was no sound but the splash in the water; but at a long distance whenever I could see the splash with my glasses I could make certain of hearing the roar some minutes after. I was chiefly looking ahead, *i. e.*, southwards, but my impression is that I saw some and heard the same echo from upstream too. Echo probably has a great deal to do with it, and very likely bombs fired near the river may echo with a similar reverberation. Once 28th to 31st January 1879 I was out camping by Chur Hime on the east side of the Meghna at the boundary between Tipara and Noakhali districts. About sunset, ebb-tide I think, Mr. F. Jones the Collector of Tipera and I were walking back to our boats along the water's edge, it is a low shelving shore, and the high bank would be on the western side of the stream but at least six miles off. I fired off my gun and we were both startled nearly two minutes after to hear a loud echo come from the other side across the water, *i. e.*, from S. W., after an interval it sounded again and again, as if it were echoing backwards and forwards from one side of the river to the other. We fired a number of times to try it, and always with the same result, after waiting $1\frac{1}{2}$ to 2 minutes the echo came and repeated itself in the same way. When a 12-gauge shot gun with $3\frac{1}{4}$ drachms powder can wake up an echo like that, it is not unreasonable to suppose that any larger sound may echo even scores of miles. The Meghna is such a huge desert of water there is room for any sound to develope itself—it flows cutting out huge curves alternately on the two banks, and the islands, or *churs*, which form upon the shallow sides are cut out by intersecting channels on the same pattern but on a smaller scale: and the echoes probably travel along the hollow curve where the high bank is. That sounds may travel a great way I know well. Once in the cold weather I was out in camp in the low hills at a place called Darooteng in Poori district, about ten miles south of Cuttack town—it was about sunrise, clear and cold—I heard sounds like a hundred paviours at work with heavy rammers somewhere near, as it seemed; but my shikari said it was the Regiment in Cuttack fort, and I

found out he was right; every musket shot was a distinct thump—the wind was from them to me.

I have often heard the distant thunder over the sea both here and at Pooree, where I lived within 100 yards of the sea for $2\frac{1}{2}$ years, it might easily be taken for a Barhisal "gun" sometimes. I have also often heard and watched the booming of the sea rollers which Mr. Pellew speaks of both at Pooree and here, and in the mouth of the Meghna once about Hatia island. At Pooree one sees this to perfection about October—and I have no doubt the sound of one of these toppling rollers would echo up the Meghna every bit as loud as the falling bank does. The sea is smooth, and a long wave which looks as if it were one unbroken line for miles rolls up on the outer surf bank, rising higher and higher till one can see the light through it. I suppose 10 or 12 feet high it must be and it falls over with a grand roar—but sometimes part of the wave breaks too soon in two or three places, or outruns the main line, and then the fall of the water becomes irregular, and there is a series of sharp explosions because the higher parts of the broken line of wave not only fall forward but fall inward, *i. e.*, two faces of water slap together, it is not easy to describe but the wave instead of falling over evenly all along the line, seems to run up to a peak and explode in one place, then again in another place and so on. This sort of noise would make a very good echo. At page 8 of the pamphlet by Col. Waterhouse I see a mistake is made by Mr. Rainey there quoted concerning an "*active volcanic train*" which is supposed to run up and down this coast. There is nothing volcanic anywhere near, but no doubt Mr. Rainey is thinking of the burning springs in Sitakund range and the so-called "Mud Volcanoes" of Ramree and Cheduba. These are nothing but escapes of marsh gas—the whole country for hundreds of miles is water-formed, recent alluvial clay shale and such like—and full of marsh gas. I have seen the Jack-o-lantern in Chittagong town itself, and you may often see bubbles come up in the swimming tank. In the marshes, which they call here "*dofa*" and in Sylhet they call "*hawar*," there are explosions heard sometimes which are very likely sudden jets of marsh gas (or rather the echo of such a belch) when the air is still—and that gives rise to a suggestion; is it not possible that where two currents run together and form a shoal in the glue-like mud which we have in these rivers, all the gas it contains may be pressed together and form a sort of bubble under the shoal? Sometimes the top of a mud bank is caked and cracked by the sun while a foot or two below it is semifluid like custard. I know that cavities form in some of these—possibly by the underpart running out in an extra low tide—for the Kutubdia embankments sometimes sink and show such a hole as one might bury an ele-

phant in, and walking over the dry surface one can hear the whole mud flat gurgling and gulping underneath. It is likely that the water may sometimes run suddenly over such a hole, and the air would come out with a slap, but this is all surmise. As for the 'Swatch of No-ground' you have been over it often enough. My idea is, that sudden noises of various kinds go to make up the so-called "guns," and that the curious part of them is more in the echo than anything else. There is always a favourable point for an echo, and it may be heard well at the right point, and yet not be heard in neighbouring places.

The following papers were read—

1.—*Note on an inscribed seal of Kumára Gupta.*—*By* Mr. V. A. Smith, (the seal above referred too).

The paper will be printed in the Journal, Part I.

2.—*Græco-Roman Influence on the Civilization of Ancient India.*—*By* Vincent Arthur Smith, *Bengal Civil Service.*

(Abstract.)

The essay is divided into nine chapters, the contents of which may be briefly summarized as follows:—

*Chapter I. Introduction.*

The Indian expedition of Alexander the Great was, so far as our definite knowledge goes, the first occasion of close, conscious contact between East and West. His empire, though itself transitory, resulted in a permanent diffusion of Hellenic culture in Asia. The working of Greek ideas on Indian soil, though traceable in the fields of religion, poetry, science, and philosophy, is most obvious in the domains of architecture and plastic art, and the greater portion of the following essay is therefore devoted to the consideration of Indo-Hellenic architecture and sculpture.

*Chapter II. Indo-Hellenic Architecture.*

In N. W. India the pillars in the Indo-Persian style were gradually supplanted by pillars imitated from Greek models. Strictly speaking, no Indo-Grecian style of architecture is known. The ascertained facts prove no more than that the Indians used in buildings planned after their own fashion, pillars copied, with modifications, from Greek prototypes.

In Káshmír and the Salt Range a modified form of the Doric pillar was employed. The Indo-Doric pillar is not associated with Indo-Hellenic sculpture, and, being a purely local development, is not further considered in this essay.

In the early centuries of the Christian era on the north-west frontier of India, that is to say, specially in the Gandhára country, or Lower Kábul Valley, in the neighbourhood of Pesháwar, pillars, the designs of which are modifications of the Ionic and Corinthian types, were commonly used.

The proper extension of the term Gándhára is discussed.

The Gándhára territory, in the wider sense including Taxile etc., was the principal seat of Hellenic culture in India, and from one or other part of it nearly all the known examples of Indo-Hellenic art in its most characteristic forms have been obtained. In a foot-note references are given to the principal collections of such examples, and to the publications describing them.

The Gándhára school obviously deserves, though it has not yet obtained, a place in the general history of Greek architecture and sculpture. The art of Gándhára is in the main Greek or Roman, not Indian.

The scanty Indo-Ionic remains are examined at length, and shown to date from about the beginning of the Christian era.

The peculiarities of the abundant specimens of Indo-Corinthian pillars are next discussed. The chronological question is reserved for full discussion on a later page.

*Chapter III. The Gándhára, or Pesháwar School of Sculpture described.*

This section is devoted to the description in considerable detail of selected characteristic works of the school, the discussion of aesthetic and chronological questions being reserved, so far as possible, for chapter V.

The eldest known Indo-Hellenic sculpture found in the Panjáb is the statuette of Pallas Athene in the Lahore Museum. It is contemporary with Azes, about the beginning of the Christian era.

Leitner and Cunningham consider the figure of 'the Śaka King' to be the most striking piece in the extensive collection at Lahore. Other statues of so-called 'kings' are next discussed.

Most of the Gándhára sculptures are distinctively Buddhist. Select examples of sculptures illustrating the nativity, preaching, and death of Gautama Buddha are described in detail. In Gándhára art he is frequently represented as wearing moustaches, and with the right shoulder draped.

The suggestion is offered that the later practice of always representing Buddha and the Jain saints with curly negroic hair was merely a conventional survival from archaic art, and was probably derived from a bronze prototype.

The *Játakas*, or Birth-Stories, often formed the theme of Gándhára sculptors, but few examples of this class of works have been preserved. The sculptures of the risers of the steps of the monastery at Jamálgarhi offer the best preserved examples, which may be studied in the British Museum. The carvings on these risers are described at considerable length.

Certain sculptures, specimens of which exist both in London and Calcutta, are described, and shown to be imitations of the Greek Gigantomachia. The conjecture is hazarded that the Indian conception of the Asuras is a derivative from the Greek myth of the giants who warred with the gods.

A group (of which several specimens are known), and which represents a young woman being carried off by an eagle, is shown, (as first pointed out by Cunningham), to be an imitation of the celebrated Rape of Ganymede, by Leochares, which continued to furnish a model to Greek and Roman sculptors for centuries.

A curious panel on which Greek soldiers are shown is next discussed, and the Greek origin of comic friezes representing boys riding on lions and so forth, and of the frequent figures of centaurs, tritons, and other monsters is briefly referred to.

The section closes with a summary account of the detached stucco heads, which are the most abundant relics of Gándhára art.

*Chapter IV. Hellenistic Sculpture in India Proper.*

The works, select specimens of which are noticed in this section, are much less numerous than those of the Gándhára school. The series begins with the sculptured capitals of Aśoka's monoliths, some of which are decorated with the honeysuckle ornament characteristic of Ionic architecture.

The centaurs, tritons, etc., seen at Bhárhut, Buddha Gayá, and elsewhere are evidently of Greek origin, as also is the four-horsed chariot of the sun, several examples of which in ancient Indian sculpture are known. Ordinarily, in Indian mythology, the solar chariot has seven horses.

The most easily recognizable Hellenistic sculptures, out of the Panjáb, are found at Mathurá, and comprise two groups, which seem to refer to the myth of Silenus, and a group of Hercules and the Nemean lion. These works are briefly described and discussed.

*Chapter V. The Chronology and Affinities of the Gándhára or Pesháwar School of Sculpture.*

This is the principal portion of the essay, and the subject is treated

in a somewhat elaborate way. It would be impossible to give an adequate summary of the arguments in a small space.

The external evidence for the date of the Gándhára sculptures is first examined. It falls chiefly under three heads, Epigraphic, Numismatic, and the records of the Chinese pilgrims.

The only inscription which gives any real help in determining the chronology is the one dated 274, recently discovered by Mr. L. White King. Reasons are given for referring this date to the Śaka era, and interpreting it as equivalent to A. D. 352.

The numismatic testimony is very scanty. Coins of Azes fix the approximate dates of the Taxilean temples with Ionic pillars and of the statuette of Pallas Athene.

The finding of coins of Vasu Deva at Jamálgarhi does not conflict with the other evidence which refers the remains at that site to the early part of the third century A. D.

The details of the reported discovery of coins of Kanishka at Sanghao are very puzzling, and, if implicitly accepted, would involve the dating of almost all the Gándhára sculptures earlier than A. D. 78.

It is shown that this conclusion is altogether inadmissible, and that consequently there must be some mistake in the observation of the discovery of Kanishka's coins, or in the interpretation of that observation.

A long argument is devoted to the establishment of limiting dates for the sculptures, and the gradual contraction of these limits by supplementary reasoning. Mr. Fergusson's and Sir A. Cunningham's opinions are discussed at length, and the relations between the Gándhára school and the art of the Roman empire are examined and illustrated in detail. The records of the Chinese pilgrims are utilized to supplement the evidence offered by the sculptures themselves.

A brief *résumé* of the known facts concerning the commercial intercourse between India and the Roman Empire is given to facilitate the comprehension of the comparisons made between Indian and Roman art, and to assist in fixing the limiting dates.

The principal conclusions finally arrived at are :—

(1.) That the Taxilean temples with Ionic pillars, and a very few sculptures, notably the statuette of Pallas Athene, date from the beginning of the Christian era, or a little earlier; and are, like the sculptures at Bhárhut and Buddha Gayá, results of Hellenistic, as distinguished from Roman, influence.

(2). The sculptures from the Gándhára or Yusufzai country near Pesháwar are the work of a local school, probably founded by a foreign colony, which drew its inspiration directly from Roman, and, only remotely, from Greek art.

(3). None of the Romano-Buddhist sculptures are earlier than 200 A. D., or later than 450 A. D. The best specimens belong to the period A. D. 200—350.

(4). Romano-Buddhist sculpture shows some affinity with the style of decoration employed on the great temples at Baalbec and Palmyra in the second and third centuries of the Christian era, but its closest relationship, (and the connection is very close indeed) is with the Roman Christian sculpture of the period A. D. 250—450, as seen in the Catacombs.

*Chapter VI. The Indian Schools of Painting.*

Colour was used to enhance the effect of sculpture both in Gándhára and at Amarávatí, and it is highly probable that wall paintings also existed in Gándhára. No specimen of such painting, however, has yet been discovered, and the ancient Indian schools of painting are at present known only from the remains of their works in the caves of Western India.

Considerable fragments of large and elaborate pictures on plaster still exist at Ajantá in the Nizam's Dominions, and at Bágh in the south of Málwá.

The criticisms of Messrs. Fergusson and Griffiths on these works are quoted, and the author expresses his belief that pictures of such considerable merit must have been produced under the influence of Western art. The natives of India have always shown an incapacity for the artistic treatment of the human form, except during the time when Hellenistic and Roman influence was potent.

*Chapter VII. The Art of Coinage in India.*

Concerning the origin of the art of coinage in India the author expresses the opinion that, though all ancient Indian coinages with the slightest pretensions to artistic merit are ultimately of Greek origin, yet the idea of coining money, and a knowledge of the simple mechanical processes necessary for the production of rude coins originated independently in India, or, at the least, were not borrowed from the Greeks.

The approximate date at which money struck to a definite standard of weight was first minted in India cannot be determined.

The most primitive pieces are blanks of silver, struck to the standard of 32 *ratis*, 58½ grains. Such pieces, and some of the uninscribed punch-marked coins, afford no indication of age. Sir A. Cunningham's belief that they are as old as B. C. 1,000, does not appear to rest on evidence.

The author holds that it would be impossible to prove that any given extant piece is older than the time of Alexander the Great, though

it is quite possible that some of the primitive coins may be considerably older.

The oldest Indian coins to which a date can be assigned are those issued by Sophytes, the contemporary of Alexander, in imitation of Syrian coins.

The only valid reason for supposing the blank and punch-marked coins not to be of Greek origin is that they show no trace of Greek influence either in weight or device. They cannot be proved to be older than the age of Alexander the Great.

The earliest Indian inscribed coins belong to the period of Aśoka. It seems probable that the use of legends on coins was one of the many effects produced in India by contact with the Hellenistic world.

It is impossible to be certain when the use of rude coins of Indian standard altogether ceased—it may have lingered in out-of-the-way parts of the country until comparatively modern times.

Aśoka's coinage must apparently have consisted chiefly of rude, uninscribed coins of Indian standard, in silver and copper. The inscribed coins of his age are rare, and do not record any king's name.

The general adaptation in India of Greek or Græco-Roman types of coinage was the result of Indo-Scythian invasions about the beginning of the Christian era. The Indo-Scythians also introduced gold coinage. Their gold coins are essentially Greek *stalers*, though showing the influence of various foreign ideas.

The Gupta coinage is intimately related to the Indo-Scythian, and its devices exhibit faint traces of Greek influence as late as A. D. 400.

The die-cutters of India never attained any high degree of excellence in their art. Their failure in the artistic treatment of the human form stands in sharp contrast to the success of the Bactrian mint masters. The peculiarities of Bactrian numismatic art are briefly explained.

The use of Greek legends on the coins of Indo-Scythian kings in the first and second centuries of the Christian era shows that a knowledge of the Greek language was then diffused in India to a considerable extent. The knowledge of Greek seems to have lingered longest in Guzerat. Corrupt Greek letters are found on coins of Skanda Gupta, struck in that region as late as A. D. 450.

It is curious that no Greek inscription has been found in India.

The numismatic facts above summarized help to render credible and intelligible the alleged Greek influence on Indian literature, science, and philosophy, to the summary consideration of which the few remaining pages of the essay are devoted.

*Chapter VIII. The Origin of the Indian Drama.*

The author accepts the theory maintained by Professor Windisch that the Indian drama was developed by the help of Greek influences,

and that a real connection exists between the Sanskrit dramas and the New Attic Comedy of Menander and the other writers of his school.

"We must," says the Professor, "recognize either a wonderful case of pre-established harmony, or the existence of Greek influence on the Indian drama."

The section is mainly occupied with an analysis of the arguments advanced by Dr. Windisch.

It is not contended that any Indian play is a translation or free adaptation of a given Greek piece. On the contrary, the best Indian plays are the work of native genius of high order, employing native materials in its own way, and for its own ends, but first set in motion by a powerful impulse received from abroad. The case of the drama is analogous to that of the Amarávati sculptures.

*Chapter IX. Græco-Roman Influence on the Religion, Mythology, Science, and Philosophy of India. Conclusion.*

In this concluding chapter the author does not attempt to discuss the vast subject indicated by the heading, but merely takes a cursory glance at some of the results of modern research.

It is plain that Hindu religion and mythology were considerably affected by Hellenic influences, and the Hindu systems of philosophy, specially the Vedánta, show marks of Western influence.

It is now admitted that Indian astronomy, as an exact science, was learned from the Alexandrian astronomers of the school of Ptolemy. Some competent scholars deny the originality even of the logic and grammar of India. Whatever be the exact degree of the indebtedness of India to Greece, it is now certain that ancient Indian civilization was much less original and self-contained than the early European Sanskrit scholars supposed, and that the Sanskrit literature (excepting perhaps the Vedas) does not date from a very remote period.

The concluding paragraphs draw attention to the startling historical problem propounded by the sudden appearance in India during the third century B. C. of long documents in two diverse, highly developed characters, of stone architecture, stone sculpture, chronological eras, inscribed coins, and a missionary state religion.

The paper will be published in full in the Journal, Part I.

3. *Natural History Notes from H. M.'s Indian Marine Survey Steamer* 'Investigator,' Commander A. Carpenter, R. N. *Commanding.* No. 10. *List of* Pluronectidae *obtained during the years* 1888 *and* 1889, *with description of new species.—By* A. Alcock, M. D., *Surgeon Naturalist to the Marine Survey.*

The paper will be published in full in the Journal, Part II.

## Library.

The following additions have been made to the Library since the meeting held in July last.

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# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

## For November, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday the 6th November 1889 at 9 P. M.

E. T. Atkinson, Esq., C. S., Vice-President, in the Chair.

The following members were present:

H. Beveridge, Esq., E. C. Cotes, Esq., Bábú Saratchandra Dás, E. Gay, Esq., Dr. G. M. Giles, Dr. Hoernle, C. Little, Esq., Dr. K. Macleod, Kumár Rameshwár Maliáh, W. H. Miles, Esq., T. R. Munro, Esq., L. de Nicéville, Esq., J. D. Nimmo, Esq., Dr. P. K. Ráy, W. L. Sclater, Esq., Bábú Hiralál Sen, Pandit Haraprasád Shástri, Dr. W. J. Simpson, J. Wood-Mason, Esq.

Visitor. J. A. Cairns, Esq.

The Minutes of the last meeting were read and confirmed.

Ninety-four presentations were announced, details of which are given in the Library List appended.

The Secretary reported that the following gentlemen had been elected Ordinary Members of the Society during the recess, in accordance with Rule 7.

J. D. Nimmo, Esq.
Munshi Aziz-ud-din Ahmad.
H. H. Prabhunarain Singh, Bahádur, Mahárájá of Benares.
Rájá Rámranjan Chuckerbutty, Bahádur.
J. C. Bose, Esq., M. A.

The following gentlemen, duly proposed and seconded were balloted for and elected Ordinary Members :

Hon'ble Rájá Rameshwára Singh, Bahádur.
Dr. Edmund James Simpson.
Pandit Jwála Prashad, M. A.
J. R. Adie, Esq., M. B.
W. A. Lee, Esq.
Dr. J. H. Tull Walsh, I. M. S.
Capt. D. C. Phillott.
W. B. Colville, Esq.

The following gentleman has intimated his wish to withdraw from the Society :

Kumár Nilkrishna Deb, Bahádur.

The Secretary reported the death of the following Member :

E. J. Jones, Esq.

also that the election of Major A. W. Jamieson had been cancelled at the request of that Officer, who reported his inability to take up Membership at present as he was contemplating an early return to Europe ; and that the election of the following gentleman had been cancelled under Rule 9, as he had not paid his admission fee and first quarter's subscription.

Bábú Surendranath Ráy, B. L., proposed by Bábú Asutosh Mukhopádhyáy.

The Secretary announced that J. D. Nimmo, Esq., had compounded his subscription as a Resident Member by the payment in a single sum of Rs. 420.

The Chairman announced that Mr. Beames had been elected a Member of the Council in consequence of the vacancy caused by the death of Dr. Waldie.

The Chairman read the following letter from Mons. A. Suchetet, asking to be furnished with the names of Naturalists belonging to the Society, and others, to whom he could address enquiries concerning hybridity regarding birds, reptiles, insects &c.

" L'anneé dernière j'ai eu l'honneur de vous adresser plusieurs demandes concernant *l'hybridité dans le régne animal*, vous avez été assez bon pour m'envoyer des indications qui m'ont été très utiles. Mon intention est, cette année, d'ecrire à un grand nombre de naturalistes pour savoir s' ils possédent dans leurs collections quelques pieces hybrides ou s' ils ont observé eux mêmes soit à l'état libre, soit dans la captivité,

des croisements entre espèces animales (oiseaux, reptiles, insectes, coquilles, ou autres). Vous seriez donc bien aimable de me communiquer la liste des membres de votre société que vous avez probablement imprimée dans vos archives ; dans le cas contraire votre secrétaire voudrait-il avoir l'obligeance de me la copier (inutile d'ajouter que je m'offre à payer les honoraires pour le temps passé à ce travail qui me serait *d'une grande utilité*).

" J'espère, Monsieur le Président, que vous voudrez bien acceder à ma demande, mon but seul, en vous demandant cette liste, est de me renseigner près des naturalistes qui peuvent avoir quelques faits à me communiquer.

" Je vous prie, avec mes remerciements bien sincères, d'agréer l'expression de mes sentiments les plus distingués.

A. Suchetet.

Propriétaire a' Breauté par Goderville au chateau d' Autiville.

Seine Inférieuse.

*le* 31 *Julliet*, 1889. France.

The Chairman read the following translation of a French letter from Mons. E. Senart reporting his inability to attend the Congress at Stockholm, where he had been asked to represent the Asiatic Society.

" I intended to send you a résumé of the proceedings of the Stockholm Congress and to express to you at the same time my lively appreciation of the honour the Asiatic Society of Bengal conferred on me by asking me to represent it at the Congress. With deep regret I have to inform you, to-day, of my inability to discharge the mission with which I have been entrusted. I was on my way to Stockholm, when circumstances over which I had no control whatever, compelled me to return. Under any circumstances I would have regretted this deeply ; all the more so, as in this manner I was prevented from availing myself of the flattering distinction which the Society has bestowed upon me.

" May I ask you, Mr. President, to convey to the Council of your Society my apologies, as well as the expression of my sincere gratitude. The remembrance of the flattering honour which the Society intended to bestow on me will always be very precious to me, and add to the debt of gratitude which I already owe to your distinguished Society.

" Please to accept, Mr. President, the assurance of my respectful sentiments, with which I have the honour to remain

Yours very sincerely,

*October 5th*, 1889. Emile Senart.

The Philological Secretary read a letter from Mr. Sandford, forwarding a note from Mr. Chamberlain together with some coins found at Vynot, near the N. W. Railway Station, Reti.

The Philological Secretary exhibited eleven early Muhammadan coins presented by Thakur Raghubir Baksh Sing, Talukdar of Rehwan, Rai Bareli district, through Mr. V. A. Smith; also two specimens of silver coins found in the Hardoi district, presented by the Government of the N.-W. Provinces and Oudh.

The Philological Secretary read reports on the following finds of Treasure Trove coins.

1. Report on 196 coins forwarded by the Deputy Commissioner of Sháhpur with his No. 624, dated 24th July, 1889.

The coins are stated to have been found in an earthen vessel in the ground near Lodhi in the Salt Range.

The metal of the coins is an amalgam of copper and silver, and, with one exception, they are all of one kind; *viz.*, coins of the Paṭhán Sulṭán of Dehlí, Ghiyáṣu-d-dín Balban, who reigned from A. H. 664-686, or A. D. 1265-1287, of the type, described and figured by E. Thomas in his *Chronicles of the Pathan Kings of Delhi*, p. 135, No. 113 (plate II, fig. 43). They show on the obverse the Sulṭán's name and title in Arabic character, and on the reverse in a circular area the word *Balban* in Arabic, and in a circular margin the Sulṭán's name and title in Nágarí characters. The single exception is a coin of Saifu-d-dín Muḥammad Kutlagh Khán, who A. D. 1255 revolted against the Sulṭán of Dehlí, Náṣiru-d-dín Maḥmúd, the immediate predecessor of Ghiyáṣu-d-dín Balban. This type of coin is described and figured in Prinsep's *Indian Antiquities* (ed. Thomas), vol. I, p. 37, (plate II, fig. 14).

2. Report on 304 silver coins, forwarded by the Deputy Commissioner of Jabalpur, with his No. 2128, dated 15th June, 1889.

The find-place is not stated in the Deputy Commissioner's letter. The coins were forwarded, with a rough and inaccurate attempt at identification, distributed in five lots.

The coins are all rupees of the following Mughal emperors of Delhi:

| | | |
|---|---|---|
| I. | Sháh Jahán, A. H. 1037-1068=A. D. 1627-1658, an indifferent specimen of the two-square-areas type; regnal year 17; | 1 |
| II. | Aurangzíb, A. H. 1068-1118=A. D. 1658-1707; indifferent specimens; mint and dates; illegible on most; one with *mihr munír.* | 9 |

III. Farrokh Siyar, A. H. 1124-1131 = A. D. 1712-1719.
Mint: Sháh Jahánábád, date 1126 on one; others illegible. 2

IV. Muḥammad Sháh, A. H. 1131-1161 = 1719-1748.
Type 1, *Ṣáḥib Qirán;* indifferent specimens: 4
Type 2, *Bádsháh Ghází;* various dates.

| | | | | |
|---|---|---|---|---|
| *a*, | Mint: | *Akbarnagar*, | specimens | 23 |
| *b*, | „ | *'Aẓímábád*, | „ | 48 |
| *c*, | „ | *Benares*, | „ | 6 |
| *d*, | „ | *Murshidábád*, | „ | 19 |
| *e*, | „ | *Bareilly*, | „ | 2 |
| *f*, | „ | *Korah*, | „ | 1 |
| *g*, | „ | *Jahángírnagar*, | „ | 2 |

105

V. Aḥmad Sháh, A. H. 1161-1167 = A. D. 1748-1754; four varieties: *a*, date in top line 10
*b*, date in middle line 42
*c*, date in bottom line 16
*d*, do, with Bahádur intersecting 15

83

VI. 'Álamgír Ẓání, A. H. 1167—1173 = A. D. 1754—1759; two varieties: *a*, date in top line: 62
*b*, date in bottom line 11

73

VII. Sháh 'Álam, A. H. 1173—1221 = A. D. 1759—1806, two varieties: *a*, date in top line 24
*b*, date in bottom line 7

31

Grand Total ... 304

3. Report on 112 silver and two gold coins forwarded by the Officiating Collecter of Tipperah with his No. $\frac{401\ G}{XVIII\text{-}1}$ dated 25th June 1889.

The coins are stated to have been found while reducing the plinth of the western house of Bábú Dwija Dás Datta of Gutaura in Ph. Serail, Sub-Division, Brahmanbarriah. Their value is stated to be Rs. 112-10 of the silver and Rs. 44-4 of the gold coins. Together with the coins a gold *tabíz* or amulet-holder, value Rs. 18-12, was found, which, however, has not been forwarded to me.

The coins belong to the following Mughal Emperors of Delhi:

I. Muḥammad Sháh, A. H. 1131—1161=A. D. 1719—1748.

(*a*) two gold mohurs, Type *Ṣáḥib Qirán* mint Dáru-l-Khiláfat Sháhjahánábád. 2

(*b*) three Rupees, type *Bádsháh Ghází*, mint Arcot and Súrat; dates illegible. 3

II. Aḥmad Sháh Bahádur, A. H. 1161—1167=A. D. 1748—54.

two Rupees, mint Arcot, date illegible. 2

III. 'Álamgír Ẓání, A. H. 1167—1173=A. D. 1754—1759.

74 Rupees of two varieties, mint Arcot, date illegible. 74

IV. Sháh 'Álam, A. H. 1173—1221=A. D. 1759—1806.

(*a*) South-Indian variety, mint Arcot; legible dates 1205, 1198, 1183, 1206, 1199.

(*b*) North-Indian variety, mint Murshidábád. 29

(*c*) Three eight-anna and one four-anna pieces; mint Murshidábád. 4

Total ... 114

4. Report on 17 old silver coins forwarded by the Collector of Murshidábád with his No. 854-G, dated July 30th 1889.

The coins consist of 7 eight-anna and 10 four-anna pieces of the emperor Sháh 'Álam, but of British mintage, all except one bearing the mint name Murshidábád and the date 19 of Sháh 'Álam's reign, though they were really struck in Calcutta. The one exception is a four-anna piece bearing the mint name Farrukhábád and the year 40 of Sháh 'Álam's reign, but also struck at Calcutta. Though not very old, small coins of this description are not often found, and therefore possess some numismatic value.

5. Report on 175 old silver coins, forwarded by the Assistant Commissioner of Ajmere with his No. 427, dated 18th April 1889 and No. 644 of the 22nd June, 1889.

The coins are said to have been discovered in Márwáṛá without any further specification of the find place.

They belong to the so-called class of Indo-Sassanian coins, that is, coins struck in India in more or less crude imitation of the Persian coins of the Sassanide dynasty which reigned from A. D. 226-652. Coins of

this description have been occasionally found, and specimens of several different kinds have been described and figured in Prinsep's *Indian Antiquities*, Wilson's *Ariana Antiqua* and elsewhere. But no Indo-Sassanian coins, so far as I am aware, of a type so closely resembling the real Sassanian coins as those of the present find, have ever been discovered. Those approaching nearest to the present coins are figured in Plate XXXIII (figs. 7, 8, 9, 10) of Vol. I, of the *Indian Antiquities.*

The coins of the present find show a very striking resemblance to the genuine coins of the Sassanide king Fírúz, who reigned from A. D. 459-486. His coins are of two different types of which one appears to belong to the earlier part and the other to the later part (about A. D. 471-486) of his reign. It is the latter type (*i. e.*, later type) of Fírúz's coins which the coins of the present find resemble. The distinguishing features of these later coins of Fírúz are: on the obverse, the king's bust wearing a tiara to which two eagle's wings are attached and which is surmounted by a crescent enfolding a globe or a star. The king's face is more or less bearded and occasionally moustached, his hair is gathered in a coil at the back of his head. In the field, in front and behind the head, are the conventional corkscrew fillets. On the reverse there is the usual fire-altar flanked on each side by a human figure and surmounted on the right by a crescent and on the left by a star. In exceptional cases the star is on the right and the crescent on the left, and in some others there is another crescent instead of the star. On both the obverse and reverse there are Pahlaví legends. See E. Thomas's *Sassanians in Persia*, plate V, figs 8 and 9. Every one of these particulars is clearly traceable, though in somewhat cruder execution, on all the coins of the present find. There is only one noteworthy exception; on none of them is any Pahlaví legend, nor indeed any legend whatsoever.

The coins are distinctly divisible into two classes according to the features of the head represented on the obverse. On those of Class I the head is of a distinctly Sassanian type, and in the better specimens has a decided resemblance to the head of Fírúz as seen on his coins. On those of Class II, on the other hand, the features are those of a rude Barbarian with thick lips and large nose, not unlike those of the Indo-Scythian king Kadphises on some of his well-known gold-coins. The coins of Class I, are of two different types, distinguished mainly by the artistic execution of the head. Under each type there are the two varieties marked by the position of the star and crescent on the reverse; there is a third variety which clearly shows the moustache of the king. One specimen shows clear traces of having been twice struck.

The age of the coins may be determined by their remarkably close

imitation of Fírúz's coins. They cannot be genuine coins of Fírúz for two reasons, (1) because their execution does not quite come up to the standard of Fírúz's known genuine coins; and (2) because they do not bear any Pahlaví legend. At the same time they must be of Fírúz's time, that is, of the latter half of the 5th century A. D.; they cannot be of a later date, for in that case they would rather imitate Sassanian coins of Fírúz's successors. From the absence of any Pahlaví legend and Sassanide king's name, it may be concluded that the coins were not issued either by a Sassanide king or by any of his vassals or governors. They must be the issue of some hostile king who adopted Fírúz's coinage, but omitted Fírúz's name. It is known from history that during the latter part of his reign, Fírúz was engaged in calamitous campaigns against the white Huns in which he lost his life. The Huns annexed the Eastern districts of the Sassanide kingdom (Khorasan and Kabul), and then passed on to the invasion of India. It was probably their leader who about this time (A. D. 470—486) adopted Fírúz's coinage. He naturally omitted Fírúz's name, though he at first retained Fírúz's likeness on the obverse (Class I). Subsequently he appears to have substituted his own likeness for that of Fírúz (Class II). At the time of the Hunnic invasion of India their leaders were Toramáṇa and his son Mihirakula. The latter succeeded his father about A. D. 515; and Toramáṇa appears to have had a rather long reign, so that he may have succeeded to the leadership of the Huns about A. D. 470 or perhaps even earlier (see Fleet's Introduction to Vol. III of the *Corpus Inscriptionum Indicarum*, pp. 10-12). His Indian campaigns, during which he conquered Kashmir, the Panjab, Sindh, Rajputana and a portion of Central India, probably fell within the period A. D. 490—510. In India it is known from extant coins of his that he imitated the contemporary Gupta coinage, and he appears to have observed a similar practice in Kashmir. It is, therefore, probable that he followed a similar course during the period of his conquest of portions of the Sassanide kingdom, and that the coins of the present find, the age of which coincides with that of Toramáṇa, are issues of the latter king. They may have been carried by his advancing army into India, and thus be brought to the place where they have now been discovered. It is curious that these coins should bear no legend whatsoever, though Toramáṇa's Indian, as well as Kashmirian, imitated coins are inscribed with his name. Perhaps the fact may be accounted for by the circumstance that his Sassanian imitations were his first attempt at coining money of his own. If my suggestion that these coins are issues of Toramáṇa should prove to be correct, the barbarian head on the obverse of Class II, may be a portrait of Toramána himself.

Accordingly the coins may be classified thus :—

Class I, obverse : Sassanian Head.

Variety 1, fair execution (head of Fírúz)

| | No. of Specimen. |
|---|---|
| Sub-variety *a*, reverse : star on left, crescent on right, ... ... | 12 |
| „ *b*, „ : crescent on left, star on right, ... ... | 18 |
| „ *c*, „ : crescent on both sides, ... | 2 |
| „ *d*, „ : double-struck, ... | 1 |
| Total, ... | 33—33 |
| Variety 2, crude execution (head of Fírúz) | |
| Sub-variety *a*, reverse : star on left, crescent on right, ... ... | 37 |
| „ *b*, „ : crescent on left, star on right, ... ... | 27 |
| Total, ... | 64—64 |
| Variety 3, moustached head ; reverse of all have star on left, crescent on right, total, ... ... | 30 |
| Indifferent specimens of Class I, total, ... ... | 39 |
| Class II, obverse : Barbarian Head, total, ... ... | 9 |
| Total ... | 78—78 |
| Grand total, ... | 175 |

6. Report on 395 old coins forwarded by the Deputy Commissioner of Sháhpur with his No. 586, dated 10th July, 1889.

The coins are stated to have been found in an earthen vessel on a hill-side near the village of Chitta in the Salt-range by a man called 'Álam Khán, who was digging out stones to make a wall.

The metal of the coins is a mixture of silver and copper. Their size is very small, about that of a 2-anna piece. They belong to Saifu-d-dín Ḥasan Qurlagh about A. H. 620=A. D. 1222. They have been described by E. Thomas in his *Chronicles of the Pathan Kings of Delhi*, p. 96. They are coins of the so-called "bull and horseman" type and have been found rather numerously of late. On most of them (321 specimens) the legends are illegible ; on the remainder (74 specimens) the legend is more or less fully preserved.

The Philological Secretary read the following letter from Bábú Gaurdás Bysack, announcing the presentation to the Society of a copy of Giridhara's translation of the "Gíta Govinda."

"In forwarding a copy of Giridhara's metrical translation of Jayadeva's immortal lyric the "Gíta-Govinda", which the editor Bábú Shámlál Bysack has handed me for presentation to the Asiatic Society, I think the fact that the translation was made by Giridhara so long ago as in the Bengali Sakábda 1658 (A. D. 1736) should be noticed. It did not appear before the public till the editor Bábú Shámlál published it only the other day with copious notes and a sketch of Jayadeva's life.

"The translation appears to be as literal as the language would allow, and what is noteworthy in it is that the metre and the music of the original Sanscrit idyll have been thoroughly preserved. Giridhara appears to have had the true poetic genius, and he can fairly claim to stand side by side with the best lyric poets of Bengal, such as Chandidása, Vidyápati and Govindadása. The best living writers of the Bengali language consider his translation by far superior to all existing translations. It is truly a literary gem. But the wonder is that the name of the poet Giridhara should have remained unknown so long to the literary world. Who this Giridhara was, it is now difficult to trace. The poet's last lines shew that he made the translation at the desire of a Vaishnava, by which he means, though he does not say as much, that as he himself was a Vaishnava, so was his patron.

"The fact of the manuscript having hitherto been in the possession of a single family, favours the supposition that a scion of that family had had a hand in the production of the work. Seeing Giridhara gifted with a poetic talent, he utilised him in effecting the translation.

"As a rule, wealthy Hindus of the olden days considered it their duty, and found special delight to encourage learned men, whether Brahmins or Vaishnavas, and among them many a poet and many a philosopher who have passed away unknown to fame, found support and patronage. The practice with the old patriarchs, specially of Vaishnava families, to make their morning prayers in hymns and songs might have led to the Bengali translation. Jayadeva's songs being popular, it is probable that Bábú Bharat Chandra Bysack, an ancestor of the editor by the maternal side who was known in his family as a learned and pious man, desired Giridhara to translate them into Bengali so that they might be set to music and sung by him in his own tongue.

"The editor and publisher Bábú Shámlál deserves the thanks of the public for having unearthed the poet after the lapse of a century and half."

The following papers were read—

1. *Some notes on the Savaras.—By* Mr. W. H. P. Driver.

The paper will be published in full in the Journal, Part I.

2. *Description of a new* Coccid *recently found attacking the Tea Plant in Assam and the Kangra Valley.—By* W. M. Maskell, Esq. *Communicated by* E. T. Atkinson, Esq.

3. *On the Tortoises described as* Chaibassia.—*By* R. Lyddeker, Esq. *Communicated by* J. Wood-Mason, Esq.

4. *Description of some new or rare species of Fishes from the Bay of Bengal.—By* Dr. A. Alcock, *Surgeon Naturalist to the Marine Survey.*

5. *The Ethiopian and Oriental representative of the Mantodean Sub-family* Vatidæ.—*By* J. Wood-Mason, Esq.

6. *Etudes sur les Arachnides de l' Himalya recueillis par* M. M. Oldham *et* Wood-Mason *et faissent partie de collection de l' Indian Museum, 1re. partie.—Par* M. E. Simon. *Communicated by the Superintendent of the Indian Museum.*

These papers will be published in full in the Journal, Part II.

7. *Ha-shang-rgyal-po and Ug-tad, a dialogue translated from the Tibetan by* Dr. Karl Marx, *Moravian Missionary at Leh, Ladakh. Communicated by* Dr. Hoernle.

8. *A tradition of Lohardagga.—By* Mr. W. H. P. Driver.

9. *A find of early Muhammadan coins in the Rai Bareli district, Oudh.—By* V. A. Smith, Esq.

10. *The Non-Brahmanical religious literature of Bengal.—By* Pandit Haraprasád Shástri, M. A.

These papers will be published in full in the Journal, Part I.

11. *Descriptions of seven additional new Indian Amphipods.—By* G. M. Giles, M. B., F. R. C. S., *late Surgeon Naturalist Marine Survey of India.*

The paper will be published in full in the Journal, Part II.

## Library.

The following additions have been made to the Library since the meeting held in August last.

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# PROCEEDINGS

OF THE

# ASIATIC SOCIETY OF BENGAL,

For December, 1889.

The Monthly General Meeting of the Asiatic Society of Bengal was held on Wednesday, the 4th December, 1889, at 9 P. M.

J. Wood-Mason, Esq., Vice-President, in the Chair.

The following members were present:

W. B. Colville, Esq., E. Gay, Esq., Dr. Hoernle, A. Hogg, Esq., Prince Jahán Qadr Muhammad Wáhid Alí, Bahádur, T. R Munro, Esq., L. de Nicéville, Esq., J. D. Nimmo, Esq., T. A. Pope, Esq., Capt. J. H. Sadler, Bábú Hiralál Sen, C. H. Tawney, Esq.

Visitors, Hon. Mr. Justice Tottenham, J. A. Cairns, Esq.

The Minutes of the last meeting were read and confirmed.

Twenty-three presentations were announced, details of which are given in the Library List appended.

The following gentleman is a candidate for election at the next meeting:

Thakur Suráj Bukhsh Sing, talukdár of Kasmanda, Zilla Sitapur, Oudh, proposed by Qazi Azizuddin Ahmed, seconded by Dr. Hoernle.

The following gentlemen have intimated their wish to withdraw from the Society.

Kumár Vinaya Krishna Deb, Bahádur.

W. Sandford, Esq.

The Secretary reported the death of Dr. James Prescott Joule, one of the Special Honorary Centenary Members of the Society.

The Chairman read the following extract from a letter from the Librarian of the Johns Hopkins University, Baltimore, regarding the usefulness of the Society's Bibliotheca Indica publications.

"I feel it due to your Society that I should express more fully than by a mere formal acknowledgement the gratitude of this University for its munificent gift of its publications, and especially the volumes of the Bibliotheca Indica. These Sanskrit and other Oriental texts are of the highest value to us. The volumes, as completed, are strongly and handsomely bound, and pass at once into the hands of our Orientalists; so that they are fulfilling the purposes which your Society is organized to promote."

The following papers were read—

1. *Notes on Indian Rotifers.—By* H. H. Anderson, B. A. *Communicated by the* Microscopical Society.

The paper will be published in the Journal, Part II.

2. *Notes on the superstitious beliefs in the Sunderbuns.—By* Pandit Haraprasád Shástri, M. A.

3. *Description of a new and little known tribe, called Pohiras, found in an out of the way corner of the Lohardugga district.—By* W. H. P. Driver, Esq.

These papers will be published in the Journal, Part I.

4. *On the occasional inversion of the temperature relations between the hills and plains of Northern India.—By* J. Eliot, Esq., M. A.

(Abstract.)

The present paper deals with certain interesting features of the temperature of the hill and plain districts of Northern India during the cold weather which were very strikingly exhibited in the month of January, 1889. On eleven nights during that month the minimum or lowest night temperature was higher at the hill stations in Upper India (average elevation 7000 feet) than at the plain stations at an average elevation of 1000 feet. On the night of the 3rd January the minimum temperature at Murree, Simla and Chakrata was from 1° to 12° higher than at all stations in the plains of the Punjab, Rajputana, Central India, the greater part of the Central Provinces, the North-Western Provinces, Behar, and the greater part of Bengal (including Calcutta). The paper is in part devoted to an explanation of this widely extended and remarkable inversion of the normal vertical temperature relations.

An analysis is given of the temperature conditions prevailing in the hills and plains in different types of weather. It is pointed out that there are three marked types of weather in January, &c., *viz.*:—

(1). Fine clear weather accompanying ordinary anti-cyclonic con-

ditions such as usually prevails in December and frequently during the greater part of January.

(2). Cloudy stormy weather accompanying rain in the plains and more or less heavy and general snow in the hills. This occurs during the eastward march of shallow barometric depressions from the north-west frontier across Northern India.

(3). The remarkably cool and dry weather with strong westerly winds which follows the clearing up of the skies after heavy and general snowfall in the mountain districts. The weather conditions are very markedly anti-cyclonic in character.

The chief temperature conditions of these periods are :—

1*st.* High day and night temperature at the hill stations and high day and low night temperature at the plains. Hence in the hills the mean daily temperature is increased and the diurnal range little affected, whilst in the plains the diurnal range is largely increased and the mean temperature differs very slightly from the normal. It is during such weather that the hill stations are occasionally warmer at nights than the plain stations.

2*nd.* In stormy weather both day and night temperatures are largely reduced at the hill stations, whilst in the plains the day temperature is increased and night temperature decreased. Hence in such weather the mean daily temperature of the hill stations is considerably below the normal, whilst the diurnal range is very slightly affected. In the plains on the contrary the mean temperature is slightly affected whilst the diurnal range is largely diminished.

3*rd.* In the fine bright weather immediately following the clearing up of the skies after heavy snowfall in the hills, both the day and night temperatures are largely reduced in the plains. The amount of vapour is rapidly diminished so that the air is very dry and bracing, and stands, more especially in Bengal, in marked contrast to the previous weather. The effect is most simply described as the passage of a cold wave eastwards across Northern India at a rate usually averaging about 300 miles *per diem*.

The last portion of the paper is devoted to a brief verbal explanation of the causes of these remarkable and contrasted variations. In the case of the prolonged fine weather of ordinary anti-cyclonic conditions (such as prevailed throughout nearly the whole of January 1889) there is little horizontal movement of the air. The adjustment of pressure to the varying thermal conditions is affected in the day time by expansion and by convective currents and at night by compression only. It is thence shewn that in such conditions the temperature above the plains of Northern India is nearly constant during such periods,

and is determined by the temperature of rapidly ascending moist but unsaturated air rising with the maximum temperature at the level of the plains. As the rate of decrease of temperature of such convective currents is about 1° for every 200 feet, the temperature at the elevation of 6000 feet above the plains of the Punjab would be about 72° (the ordinary minimum temperature of the Punjab in fine weather in January) *minus* 30° (*i. e.* $\frac{6000}{200}$) or 42°, which is 6° higher than the average minimum temperature in the plains in January (*viz.* 36°).

About sunset at a hill station in such weather temperature decreases rapidly until it has reached the temperature corresponding to the same level above the plains. There is at night a slow and steady flow from the hills downwards to the plains which gives rise to a flow towards the hills from the corresponding elevated strata above the plains. This source of comparatively warm air is so large that the air coming from it maintains a nearly constant temperature during the night at the hill stations and gives them a night temperature as high and sometimes higher in such weather than at the plain stations. This explanation hence accounts not only for the high minimum temperature at night but for the cold period of rapid cooling about sunset which is a very characteristic feature of the hill station.

The paper will be published in the Journal, Part II.

## Library.

The following additions have been made to the Library since the meeting held in December last.

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FOR 1889.


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# JOURNAL

OF THE

# ASIATIC SOCIETY OF BENGAL.

## Part I.—HISTORY, LITERATURE, &c.

## No. I.—1889.


*Coins of the Muhammadan Kings of Gujarát.—By* E. E. Oliver, Esq.

*(With 3 Plates.)*

Looking over a large number of coins belonging to Mr. Furdoonjee, an enthusiastic numismatist of Bombay—in which Presidency he had exceptional opportunities for collecting the coins of the old Muhammanan dynasty of Gujarát—I find a good number that do not appear in the British Museum Catalogue, nor in the list given by Thomas, and that, so far as I am aware, have not yet been described. Supplemented with some from my own cabinet, I have filled two or three plates, which may be interesting in continuation of those described by Mr. Poole from the National Collection.

It is unnecessary to attempt any sketch of the dynasty, that for over a century and a half, ruled the destinies of Gujarát. One of the principal of those Muhammadan States that sprung from the ruins of Muḥammad ibn Tughlaq's declining empire; and maintained more or less of splendour and of power, till they were once again reduced to provinces of Dehlí by Akbar. A useful general outline of the leading events is given in Mr. Stanley Lane Poole's introduction to the volume in the British Museum series above referred to, treating of the minor Muhammadan States; and the late Sir Edward Clive Bayley in his volume on the history of Gujarát, has brought together the more inter-

esting particulars as told by the native historians in the *Mirát-i-Aḥmadí* and the *Mirát-i-Sikandarí.*

In both, however, there is a little blank between the assassination of Maḥmúd III., and the final incorporation of the State into the Mughal Empire. This is a period regarding which most historians are silent; probably for the very excellent reasons, that there are no very accurate materials, and the accounts of native writers are somewhat conflicting, while it is perfectly accurate and more easy to sum up the whole, as being "thirty years of anarchy."

Briefly, the outline of those thirty years of anarchy is somewhat as follows: Maḥmúd III was murdered by a slave named Burhán in Maḥmúdábád, on the 12th Rabí'u-l-awwal, 961 H. (the eve of the 13th according to the Mirát-i-Sikandarí), which slave in addition entrapped and killed some twelve of the chief Gujarát nobles. Among those sagacious enough not to fall into Burhán's trap was one I'timád Khán. Originally a Hindú servant, this I'timád, whose name may be taken to signify "trusted," had risen under Maḥmúd to a most confidential position. His master even allowed him to enter the harem, and had put him in charge of the women. He had been made an Amír, and is spoken of as "prime minister." The morning after the murder, I'timád collected a few followers, killed Burhán, managed to pacify the city and restore order. It was to him that the court of Maḥmúdábád instinctively looked, to act as regent and to set about finding a successor to the throne. There seems little doubt, however, that whoever might be the nominal successor, I'timád determined to retain the substance of power in his own hands; and for the whole thirty years he was really the "king-maker" in the back-ground.

The accounts as to the actual arrangements made by him vary somewhat. According to the Áín-i-Akbarí, he raised Raẓíu-l-Mulk, "a son of Sulṭán Aḥmad, the founder of Aḥmadábád," to the throne. But Sulṭán Aḥmad the first died in 846 H., 115 years before; and Raẓí is spoken of as "very young!" The more probable version is given in the *Mirát-i-Sikandarí*, the author of which, Sikandarí ibn Muḥammad, was born in 961 H.; and relates that the nobles having concerted together, asked I'timád Khán, who was acquainted with the Sulṭán's domestic affairs, whether the Sulṭán had left any son, or if any of the Sulṭán's wives were expecting a child: if so, they would wait till the child's birth before deciding on any arrangements regarding the kingdom. I'timád said no; the Sulṭán had not left any son, nor were any of his wives expecting a child. As he was well acquainted with the Sulṭán's affairs, and denied the possibility of any direct heir, they then asked him if there was any relative of the late Sulṭán who was fit to

succeed to the throne, whom they might select. I'timád Khán replied that there was a relative of the Sulṭán at Aḥmadábád, whose name was Aḥmad Khán; they might send for him. Accordingly they sent Amír Raẓíu-l-mulk to fetch the boy. When Raẓí came to Aḥmad Khán's house, the boy was standing at a grain-dealer's shop close by his own door, and was bringing away in the skirt of his dress some grain which he had bought for his pigeons. Raẓíu-l-mulk recognised him, got out of the cart, carried him off, and placing him in it, turned it round, and drove off, with very fast horses, to Maḥmúdábád. The Khán's nurse wept, and made a disturbance, saying: "What is this? Where are you going to take him?" Raẓíu-l-Mulk called out: "I am going to take him to a place where all the world will to-morrow crowd round his house, and where he will not find one friend."

The Amír's prophecy proved true. The boy king's career was a short and a sad one. He was placed on the throne on the 15th Rabí'u-l-awwal 961 H. as Aḥmad II.; the affairs of state meanwhile remaining entirely in I'timád's hands. On the coins he calls himself "Quṭbu-d-dín, the son of Maḥmúd," titles also adopted by the succeeding puppet. Five years later Aḥmad is described as flying from his capital for refuge with one of his courtiers, but as brought back defeated. On another occasion he tried other means to get rid of his powerful minister, when the latter, beginning to feel insecure, decided to get rid of the king. One account says I'timád killed him, another that Aḥmad was found murdered outside the Palace walls on the 5th Sha'bán 968 H.

Having got rid of Aḥmad, I'timád now raised a child named Nathú to the throne, "who did not belong to the line of kings," but who he swore was a son of Maḥmúd's. The mother, when pregnant, had been handed over to him to make her miscarry, but, the child being five months old, he had not carried out the order. The nobles had to swallow this new variety of the story, and Nathú was placed on the throne as Muẓaffar III.

It was the old story of a nominal king under a powerful minister, who was the real head of the Government, and who, though several of the Amírs had secured portions of the country and declined to recognise his authority, had become practically independent. In the account of the divisions and revenues of Gujarát, given in the *Mirát-i-Aḥmadí*, I'timád's establishment and income is shown in 979 H. as all but equal to the nominal kings; he having 9,000 horse and 30 *krors* of "*tankchahs*," against Muẓaffar's 10,000 horse and 33 *krors* of *tankchahs*; the remainder of a total of 30,000 horse and 90 *krors* of *tankchahs*, being divided amongst some half dozen nobles. The result was incessant feuds. In 980 Akbar was invited by I'timád to occupy Gujarát, and

took possession of the capital on the 14th Rajab of that year. From then both the minister and king figure frequently in the accounts of campaigns under both Akbar and his generals. I'timád and other Gujarát nobles proclaimed Akbar's accession from the pulpits of the mosques, and struck coin in his name, for which loyalty Baroda, Champánír, and Súrat, were given to the former as *tuyúl*, but subsequently he fell into disgrace and was made a prisoner. In 982 H. he had been released and was in charge of the imperial jewels. Two years after he went to Makkah, and on his return obtained Patan as a *jágír*. In 990 H. he was put in charge of Gujarát as governor, in succession to Shihábu-d-dín, but the latter's forces rebelled, and went over to Muẓaffar, who in I'timád's absence took Aḥmadábád, and set up as ruler again in 991 H. Shortly after I'timád went to Patan, where he died in 995 H.

Muẓaffar abdicated in favour of Akbar in 980 H., when he was in the first instance sent to Ágrá, but subsequently remanded to close confinement. Some nine years after he escaped, and returning to Gujarát, collected a respectable force, defeated and slew Akbar's general Quṭbu-d-dín Khán, and reascended the throne 991 H. (1583 A. D.). Akbar then deputed Mírzá Khán Khánán, the son of Bairám, to retake Gujarát. Muẓaffar was defeated the same year in a couple of pitched battles, and fled to Júnágaṛh in Kattywár. There he was pursued by another of Akbar's generals Mírzá Khán-i-'A'ẓam, who hunted him down and captured him in Kachh in 999 H. No sooner was Muẓaffar handed over to the Mírzá than he asked permission to retire for a minute, and took the opportunity to cut his throat with a razor. With him terminated the dynasty of the Muhammadan kings of Gujarát, the kingdom then becoming a province of Dehlí. The coin No. XXXI is especially interesting as having been struck during the year in which, for a brief period, Muẓaffar managed to re-establish himself in Gujarát.

In the British Museum Catalogue there is a coin of 963, ascribed to Muḥammad, a pretender, and No. XXVIII of the series now published would seem to have somewhat similar titles and dates and also claim to be struck by a son of Maḥmúd, *viz.* on the Rev. *Quṭbu-d-dín Muḥammad Sháh, (bin) as-Sulṭán* x 63, and on the Obv. *Náṣiru-d-dunyá-wa-d-dín Abu-l-Fatḥ Maḥmúd Sháh.* On the other hand it is very similar in character to No. IX of Maḥmúd Sháh I., the son of Muḥammad, and the reading might be reversed, x being 8 instead of 9, but Muḥammad I. called himself *Ghyáṣu-d-dín* and not *Quṭbu-d-dín* I have not been able to trace any historical reference to the so-called "Pretender."

In order to facilitate comparison of dates, descent, or contemporary rulers, I add a genealogical tree of the Gujarát kings, and a table shewing the contemporary rules in Málwá, Jaunpur, Kandaish, the Dekkan

and Dehlí, taken from Poole's very handy graphic scheme of the Muhammadan dynasties of India.

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(See Plates I—III.)

Of Aḥmad Sháh 1. I noticed in Mr. Furdoonjee's collection similar coins to the British Museum No. 408, but with the mint Aḥmadábád for the years 832, 6, 842, 3*, and similar to No. 411 also with mint Aḥmadábád, years 830-1-7. Of Ghiyáṣu-d-dín Muḥammad Karím Sháh the Museum list gives no dated specimens. Thomas records 849, 850 and (?) 856. The three now figured read 852, 3 and 5, the last named having the same inscription as in Thomas. The Museum catalogues no silver representative of Maḥmúd Sháh *Bígará*, the famous Sulṭán of the moustachios. Thomas refers to three, of 891, 903 and 911. Neither give any mints: in fact, with one doubtful exception, none of the Gujarát series in the Museum catalogue are minted. In the list now given are silver coins of 864-7 (8)70, 909; Aḥmadábád, 900, 903, and 911. In some cases the date is in words. The Museum list has two gold coins of Muẓaffar Sháh II. Thomas's copper coins are dated 922-3-4 and 8. The one now figured is dated 929. Two others have no name but may perhaps be put down to him (?), Aḥmadnagar (9)17 and 922.

The inscription on No. XVIII of Bahádur Sháh appears to agree with No. 427 of the Museum, but I note the years 938 and 939. Maḥmúd Sháh III. bin Laṭíf is unrepresented in the Museum catalogue. Thomas gives the years 946, 7 and 9. Among these now figured are the years 945,7 and 960. The suppositious king Aḥmad II. is represented in the Museum catalogue by one copper coin; Thomas gives the dates 961—8. In the present list are the dates 961, in silver, x x 2, 963 and 8. Muẓaffar Sháh III. in the Museum and in Thomas is represented by the dates 969, 971-7-8-9 and 930. The present list adds 991.

It is also worth while adding that among Mr. Furdoonjee's dated Bahmaní coins, I notice, Aḥmad Sháh I. like the Museum No. 454, the years, 836 and 828. Like the Museum No. 461, the years 843-5-6, 850-2-6. Like No. 467, the years 839, 842-3 and 850. Muḥammad Sháh II. like No. 474, the years 863, 877 and 875, and a fine silver coin of (?) Aḥsanábád of x 77 figured in the present list as No. XXXIV. A coin of his, figured as No. XXXV, also appears a novelty.

* The above dates are all A. H.

*Genealogical tree of the Muhammadan Dynasties of Gujarát.*

1. Ẓafar Khán. Appointed Governor from Dehlí 791. Assumed independence at Anhalwárá 799 as Muẓaffar Sháh I. Died 814.

Tátár Khán.

Tátár Khán.

2. Aḥmad I. Náṣiru-d-dín, 814 to 846. Founded Aḥmadábád and extended his dominions considerably.

3. Muḥammad, I. Ghiyásu-d-dín, Karím Sháh, 846 to 855. Given up to pleasure and ease.

5. Dáúd, reigned 7 days in 863.

4. Quṭbu-d-dín, Aḥmad Sháh, 855 to 863.

6. Maḥmúd I., Bígará, 863 to 917. The most famous of the line, founded Maḥmudábád, took Júnágaṛh and Champánír.

7. Muẓaffar II., 917 to 932.

8. Sikandar, 932, murdered after a reign of 46 days.

9. Maḥmúd II., 932, a child called Náṣir Khán.

10. Bahádur, 932 to 943.

daughter 'Adil Laṭíf Khán married to Khán of Kandaish.

11. Mirán Muḥammad Fárúqí originally called Asirí, 943.

12. Maḥmúd III., 944 to 961.

13. Aḥmad Sháh II., 961 to 968.

14. Muẓaffar Sháh III., 969 to 980, when Gujarát submitted to Akbar, but Muẓaffar ruled for a short time again in 991.*

*Contemporary Rulers in*

| A. H. | Gujarát. | Málwá. | Jaunpur. | Kandaish. | Dekkan. | Dehlí. |
|---|---|---|---|---|---|---|
| 795 | .... | .... | .... | .... | .... | Maḥmúd II. |
| 796 | .... | .... | Khwájah i Jahán. | .... | .... | .... |
| 797 | .... | .... | .... | .... | .... | Naṣrat. |
| 799 | Muẓaffar I. | .... | .... | .... | Ghiyásu-d-dín. | .... |

* The above dates are all A. H.

| A. H. | Gujarát. | Málwa. | Jauupur. | Kandaish. | Dekkan. | Dehlí. |
|---|---|---|---|---|---|---|
| 799 | .... | .... | .... | .... | Shamsu-d-dín. | .... |
| 800 | .... | .... | .... | .... | Táju-d-dín Fírúz. | .... |
| 802 | .... | .... | Mubárak. | Náṣir. | .... | Maḥmúd II. |
| 803 | .... | .... | Ibráhím. | .... | .... | .... |
| 804 | .... | Diláwar | .... | .... | .... | .... |
| 808 | .... | Hushang. | .... | .... | .... | .... |
| 814 | Aḥmad I. | .... | .... | .... | .... | .... |
| 815 | .... | .... | .... | .... | .... | Daulat Khán Lodí. |
| 817 | .... | .... | .... | .... | .... | Khizr Khán. |
| 824 | .... | .... | .... | .... | .... | Mubárak II. |
| 825 | .... | .... | .... | .... | Aḥmad I. | .... |
| 837 | .... | .... | .... | .... | .... | Muḥammad IV. |
| 838 | .... | Muḥammad. | .... | .... | Aḥmad II. | .... |
| 839 | .... | Maḥmúd I. | .... | .... | .... | .... |
| 841 | .... | .... | .... | 'Ádil. | .... | .... |
| 844 | .... | .... | Maḥmúd. | .... | .... | .... |
| 845 | .... | .... | .... | Mubárak I. | .... | .... |
| 846 | Mḥd. Karím. | .... | .... | .... | .... | .... |
| 847 | .... | .... | .... | .... | .... | 'Álím. |
| 855 | Quṭbu-d-dín. | .... | .... | .... | .... | Bahlol Lodí. |
| 861 | .... | .... | Muḥammad. | Ghaní. | .... | .... |
| 862 | .... | .... | .... | .... | Humáyún. | .... |
| 863 | Dáúd. | .... | .... | Husain. | .... | .... |
| 863 | Maḥmúd I. | .... | .... | .... | .... | .... |
| 865 | .... | .... | .... | .... | Niẓám. | .... |
| 867 | .... | .... | .... | .... | Múḥammad II. | .... |
| 880 | .... | Ghiyáṣ Sháh. | .... | .... | .... | .... |
| 881 | .... | .... | Becomes part of Dehlí. | .... | .... | .... |
| 887 | .... | .... | | .... | Maḥmúd II. | .... |
| 894 | .... | .... | | .... | Becomes split up into small provinces. | Sikandar II. |
| 906 | .... | Náṣir Sháh. | | .... | | .... |
| 909 | .... | .... | | Dáúd. | | .... |
| 916 | .... | Maḥmúd II. | | A'ẓam Humáyún. | | .... |
| 917 | Muẓaffar II. | .... | | .... | | .... |
| 923 | .... | .... | | .... | | Ibráhim II. |
| 926 | .... | .... | | Muḥammad I. | | .... |
| 930 | .... | .... | | .... | | Bábar. |
| 932 | Sikandar. | .... | | .... | | .... |
| 932 | Maḥmúd II. | .... | | .... | | .... |
| 932 | Bahádur. | .... | | .... | | .... |
| 937 | .... | Becomes part of Gujarát. | | .... | | .... |
| 938 | .... | | | .... | | Humáyún. |
| 942 | .... | | | Mubárak II. | | .... |

| A. H. | Gujárat. | Málwa. | Jaunpur. | Kandaish. | Dekkan. | Dehlí. |
|---|---|---|---|---|---|---|
| 943 | Muḥammad Fárúqí. | | | .... | | .... |
| 944 | Maḥmúd III. | | | .... | | .... |
| 946 | .... | | | .... | | Sher Sháh. |
| 952 | .... | | | .... | | Islám Sháh. |
| 960 | .... | | | .... | | 'Adil Sháh. |
| 961 | Aḥmad II. | | | .... | | Ibráhím Súr. |
| 962 | .... | | | .... | | Humáyún. |
| 963 | .... | | | .... | | Akbar. |
| 969 | Muẓaffar III. | | | .... | | .... |
| 974 | .... | | | Muḥammad II. | | .... |
| 980 | Becomes a province of Dehlí. | | | .... | | .... |

Ghiáṣu-d-dín Muḥammad Karím Sháh.

I. Æ ·65 64 grains. No mint. 855 H.

... محمد شاه || السُّلطان || ٨٥٥ غياث الدنيا || و الدين

Compare Thomas, page 353.

II. Æ ·70 140 grains. 8(5) 2 H.

...ابو المحامد ||محمد شاه || السطان ٨ [٥] ٢ ... سلطان الاعظم || غياث الدنيا || والدين

III. Æ ·65 72 grains. 853 H.

سلطان || محمد ٣ شاه || ٨٥ غياث الدنيا || والدين

Maḥmúd Sháh I.

IV. Æ ·80 165 grains: (?) Aḥmadábád. 911 H.

In square محمود || شاه شاه || السلطان بن محمد

margin .. || ذيدعمر .. || .. ح .. ب .. || ٩١١ || ..... || السلطان || الاعظم || ابوالفتح || ناصر الدنيا والدين

V. Æ ·65 88 grains.

The same as No. IV, but without margin.

VI. Æ ·70 87 grains. Aḥmadábád. 900 H.

Obv. same as No. IV.

In lozenge محمود شاه || السلطان

margin .. ضرب احمد اباد [ عروج ابدانه ] سنه ٩٠٠

VII. Æ ·70 85 grains. Aḥmadábád. 903 H.
Obv. same as No. IV. In lozenge السلطان ‖ محمود شاه
margin [ضرب ..مر] حمد اباد [عروحاسانه] ۹۰۳

VIII. Æ ·70 88 grains. 909 H.
Obv. as No. IV, with 909 H. Rev., variety of No. IV.

Ditto. Æ ·50 42 grains. No date or mint Mr. Furdoonjee.

IX. Æ ·70 146 grains. No mint. [8]64, [8]67 H. Ditto.
ناصرالدنيا ‖ والدين ابو ‖ الفتح محمود شاه ‖ بن محمد شاه ‖ السلطان ۶۴ [۸]

X. Æ ·70 173 grains. No mint. (8)70 H. Ditto.
Obv. as No. IX. In circle السلطان ‖ محمود شاه
margin .. .. سبعين و ثما نما

XI. Æ ·85 250 grains. Ditto.
..توكل على ‖ المنان محمود شاه ‖ بن محمد شاه
‖ ۰ بو ل ... ا .. ى ‖ سلطان

XII. Æ ·85 245 grains.
.. لمؤيد بنصرا [الله] المـ ... كليم الله ‖ ..لسلطان ‖ محمود..
‖ .. بولغا ... ى

XIII. Æ ·75 160 grains.
.لمتو... ‖ ... الله القو... ‖ الغني محمود ش .. ‖ بن محمد ش ..
‖ [ .سلطان ] ...

XIV. Æ ·65 140 grains.
.. لسلطان الاعظ . ‖ ناصر الدنيا .بوالفتح ‖ محمود شاه ‖ [السلطان]
‖ [ و الدين ]

## Muẓaffar Sháh II.

XV. Æ ·70 169 grains. 929 H. Mr. Furdoonjee
شه ... لدنيا و... ‖ ۹۲۹ ‖ ابوالنصـ... السلطان ‖ محمود شاه ‖ بن
مظفر شاه

*XVI. Æ ·75 160 grains. 922 H.
في شهور ‖ ۹۲۲ ‖ سنه .. شهر ‖ ... ..

* Doubtful coins.

*XVII. Æ ·65 143 grains, (?) Aḥmadnagar (9)17 H.
.. مرتضى || احمد [نلر] في شهور || سنه || ١٧ [ ٩ ]

Bahádur Sháh.

XVIII. Æ ·75 175 grains. 939 H.
.. ص... لدنيا ... لد .. ين || ٩٣٩ || السلطان || مظفر شاه || بن || بهادر شاه
|| ل . ظ .. ف ..
Compare No. 427, British Museum Catalogue.

Maḥmúd Sháh III.

XIX. Æ ·80 180 grains. Mr. Furdoonjee.
.. ـه.. الواثق با [ الله ] || .. [ محمود ] || [ السلطان ] شاه شا ..
|| ال ... ا ... || लतीफ || औराज ..

XX. Æ ·70 142 grains. Ditto.
... صر الدنيا || والدين ابو || ..... محمود بن || لطيف شاه || السلطان

XXI. Æ ·80 159 grains. 945 H. Ditto.
.... قطب الدنيا والدين || ابو الفضل || السطان || شاه شاه || محمود [شاه] بن لطيف
٩٤٥

XXII. Æ ·70 137 grains. 960 H. Ditto.
.. ـو.. ثق .. لمد ... || .. اسف ... || لدنيا و الدين ابو || سلطان || شاه شاه || محمود بن لطيف ٩٦٥

XXIII. Æ ·55 69 grains.
الواثق بالله المنان || .. ـمس || السلطان || شاه شاه || محمود بن لطيف
ال .. ..ا.. ال ..

XXIV. Æ ·55 71 grains. 957 H.
... صر. . لدنيا || ٩٥٧ || ... لدين || شاه || محمود

Aḥmad Sháh II.

XXV. Æ ·85 164 grains. 961 H.
الرحمن بالله || ابو المحامد المعتصم || السلطان || شاه شاه || عهد In double
|| الدنيا و الدين || غياث || ٩٦١ || احمد بن محمود lozenge

* Doubtful coins.

XXVI. Æ ·55 73 grains. 968 H. Mr. Furdoonjee.

... سلطان || شاه سـ ... || .. حمـ .. نيا
... مـ ..... عصـ ... || .. و الدين ابو...
بن محمـ ...

XXVII. Æ ·70 140 grains. **2. *63. Ditto.

... الخليفه || امير المومنين || قطب الد... || و الدين احمد ..... ه
خلاف .. ٢ || .. سلطان

Muḥammad Sháh (?)Pretender.

XXVIII. Æ ·70 144 grains. *63. Ditto.

ناصر الدنيا و || - لدين ابو الفتح [... ان ] قطب ... || بن محمد شاه ||
|| محـ .. ود ...اه السلطان ٦٣

Compare copper coins 437—9 in B. M. Catalogue.

Muẓaffar Sháh III.

XXIX. Æ ·60 73 grains. 978

المؤيد بذا... الرحمـ ... || شمـ... الد ... ال ... طان || ٩٧٨ شاه || شاه مظفر ||
श्रीराज

XXX. Æ ·70 73 grains. 97*.

Obv. Inscription as No. XXIX. ... سطان || مظفر شاه ||
महाराज

Æ ·50 36 grains. Ditto. Mr. Furdoonjee.

XXXI. Æ ·85 175 grains. 991 H. Ditto.

In square محمد || لا اله الا الله ابن محمود شاه || مظفر In square
|| رسول الله شاه || ٩٩١ سلطان
margin ..... || ... ابو ... || ... عا .. margin ..... || ..... الرحمـ
|| .. عاد ... || لعل ... علي ...الد .. مظ ...

XXXII. Æ ·75 179 grains. 977 H.

شمس الدنيا || و الدين ٩٧٧ || مظفر شاه

Muḥammad Sháh II., Bahmaní. [doonjee.

XXXIII. Æ ·95 166 grains. (?)Aḥsanábád. x77. Mr. Fur-

... || المعتصـ ... [ بالله ] In square ..محمد شـ ... || همايونش
والمظفر شمس ... || والدين ... || السلطان خل .. خلاف ...
margin ,,, ٧٧ ...,,, || [ اح ,,, ا ا ]

Maḥmúd Sháh II., Bahmaní.

XXXIV. Æ ·70 146 grains.

المزيد ‖ بنصر ‖ محمو... ‖ بهمنى ‖ ....

*Ruins and Antiquities of Rámpál.*—By* Asutosh Gupta, Esq., C. S.

Unlike Upper India, studded with monuments of ancient history, the Delta of the Ganges presents few places of interest to the antiquarian. Lower Bengal is generally as devoid of picturesque scenery as of objects of antiquarian interest. We have all heard of Saptagráma and Suvarṇakáragráma and their once flourishing commerce with the West, but what remains to show their ancient greatness? No Colossus, no Forum, not even a Hindú temple. Still there are a few places here and there, such as Gauṛ and Nadiyá, which cannot fail to be of interest to the diligent antiquarian or the student of history, and Rámpál is one of them. It is not so widely known as it deserves to be. It is now a straggling hamlet, situated approximately in Lat. 23° 38′ and Long. 90° 32′ 10″, being about four miles to the west of Munshíganj, the head-quarters of the subdivision of that name in the district of Dacca (Ḍhákā), corresponding with the old fiscal division of Vikrámpur. It was the seat of the old Sen kings of Bengal, and notably of Ballál Sen, whose name has been handed down to posterity as the founder of Kulinism in Bengal.

Such is the case with Rámpál and the dynasty that reigned here. The ruins, as the sequel will show, are not so important and interesting as in Gauṛ and a few other places in Bengal. But there is abundant evidence to show that Rámpál was once a royal city. The large Rámpál Dighí or the artificial lake of Rámpál, the huge mound, to which tradition points as the Báṛí or the palace of Ballál Sen, the very broad roads and the existence of innumerable bricks which can be found buried under the earth wherever you dig in Rámpál and its environs, are unmistakeable indications of a ruined city of palaces. Old bricks of small size were found in such abundance in and around Rámpál, that they were carried in vast quantities to Dacca for build-

* [Compare with this paper General Sir A. Cunningham's account of the same sites and legends, in his *Archæological Survey Reports*, vol. XV, pp. 132—135. The two accounts differ in some minor details. Ed.]

ing purposes. Such is still the case with Gauṛ. Many stone idols of Hindú gods and goddesses have been found buried under the earth. There is a huge stone idol of Vishṇu near the temple of Śiva in Aṭpará, about a mile west of Rámpál, and I have seen many smaller idols collected by a Vaishṇava in 'Abdulláhpur.

Rámpál appears to have been the only seat of the Sen kings up to the death of Ballál Sen, but the later kings of the dynasty lived at Suvarṇakáragráma, Gauṛ and Nadiyá. Suvarṇakáragráma, locally called Shonárgáon, is also in the district of Dacca, being about four miles from the existing Bandar of Baidya Bazar on the river Meghná. Lachhman Sen, son of Ballál Sen, generally lived at Gauṛ, which, according to the Muhammadan historians, he greatly embellished, and called after his name Lakhnautí or Lakshmaṇavatí. Nadiyá was the seat of the last Sen king of Bengal, when the Muhammadans conquered the country. It was in his time that Rámpál attained the highest pinnacle of its glory. The principal works, the ruins of which still exist in some form or other, are attributed to him. Rámpál seems to have been neglected, if not altogetber abandoned, after the death of Ballál Sen. Lachhman Sen, his son and heir, lived principally at Gauṛ.

I now approach the solution of a problem which has already evoked much animated discussion. I mean the question of the caste of the Sen Rájás of Bengal. Before submitting my own opinion on the subject, I will briefly examine the different theories that have been advanced, and the evidence on which they are based. I have obtained much assistance from the two articles of Rájá Rájendralála Mitra on the Sen Rájás of Bengal, and the Bengalí work on the same subject by Kailásh Chandra Sinha, to which Mr. Beveridge, one of the honoured members of the Asiatic Society, very kindly referred me, and also from the Bengalí book by Mahimá Chandra Majumdar called 'Gauḍe Bráhman'. Three theories have been advanced about the caste of the Sen Rájás:—(1) that they were Kayasthas, (2) that they were Vaidyas or of the medical caste and (3) that they were Kshatriyas. The first theory is that of Abu-l-Faẓl and the Muhammadan historians. It is not supported by any evidence other than the statement of the Muhammadans, who are likely to hold erroneous views on the subject of Hindú castes. It was never seriously entertained by the Hindús and may be summarily rejected. The second theory is supported by tradition handed down from generation to generation not only in Vikrámpur, the old seat of the Sen Rájás, but throughout Bengal, and was universally believed, till Rájá Rájendralála Mitra in 1865 tried to establish that the Senas were Kshatriyas. This third theory is the most recent one. It was first propounded by Rájá Rájendralála Mitra, a very high

authority in matters antiquarian and supported by others. It is based on some epithets of the Sen kings found in the inscriptions discovered in Rájsháhí, Dinájpur and Baqarganj, and also in the Sanskrit work Dánaságara of which Ballál Sen himself is the reputed author. These I will consider in the two following paragraphs.

Tradition must give place to reliable material evidence if the one is really inconsistent with the other; but before discarding a universal belief, the evidence should be most carefully interpreted. The evidence on which the theory of the Sen Rájás being Kshatriyas is based is the following. In the inscriptions, found in the districts of Dinájpur, Rájsháhí and Baqarganj, the Sen Rájás are described as descendants of the lunar race, and as only the Kshatriyas have a right to trace their descent from that race, it is held that the Senas must be Kshatriyas. In the inscription discovered by Mr. Metcalfe in Rájsháhí, Sámanta Sen is described as a Brahma-Kshatriya. The original Sanskrit is स ब्रह्मक्षत्रियाणामजनि कुलशिरोदाम सामन्तसेनः। Dr. Mitra's rendering of ब्रह्मक्षत्रियाणां कुलशिरोदाम is 'a garland for the head of the noblest Kshatriyas.' According to him, the word ब्रह्म therefore here means 'noble' or 'exalted.' With due deference to so great an authority, I am of opinion that this meaning is not the correct one here. We have various Sanskrit words compounded with ब्रह्म such as ब्रह्मचारी, ब्रह्मराक्षस, ब्रह्मदैत्य, ब्रह्मवादी, ब्रह्मदण्ड, and so forth, and in in all of these the word ब्रह्म retains its original radical meaning of Brahmá or Bráhmaṇa. I therefore see no reason why it should not have the same or a similar meaning in the present instance. Dr. Mitra has not assigned any reason why he takes ब्रह्म to mean 'noble,' which is certainly not the commonly accepted meaning of the term, and cannot be found in the ordinary Sankrit dictionaries. At any rate this meaning would be a far-fetched one. The word ब्रह्मक्षत्रं occurs in the Yajur Veda, and is explained by the annotator as meaning ब्रह्मज्ञानक्षत्रवीर्य्य or 'knowledge of the Bráhmaṇas or the Vedas and heroism of the Kshatriyas.' It is therefore not a caste epithet, and following the analogy, we can take ब्रह्मक्षत्रिय to mean 'a person who has the knowledge of the Bráhmaṇas or the Vedas and the heroism of the Kshatriyas,' that is, one who combines both these qualifications; and the clause in question may mean 'a garland for the head of those who have the wisdom of the Bráhmaṇas and the heroism of the Kshatriyas,' without any reference to race or caste. The word ब्रह्मक्षत्र also occurs in Adhyaya 21, part IV, of the Vishṇu Puráṇa, and is explained by the annotator Śrídhara Swámin to mean 'that race from which Bráhmaṇas and Kshatriyas sprung'. The meaning seems to be obscure. The word probably means a mixed race of Bráhmaṇas and Kshatriyas—a race

sprung from Bráhmaṇas on the father's side and Kshatriyas on the mother's. We have it from the Mahábhárata that when the Kshatriya race was being exterminated by Paraśuráma, the women of that caste began to marry Bráhmaṇas, and Vaśishṭha himself is credited with having married Kshatriya women. From that time the race of pure Kshatriyas is said to have become extinct. In Adhyaya 24, part IV, of the Vishṇu Puráṇa, Mahánandi is said to be the last king of the Kshatriya race. His son Mahápadmánanda was born of a Súdra mother, and from him began the reign of Varṇasankara kings or 'kings of mixed castes.'

The above will I think be sufficient to show that Dr. Mitra's interpretation of the word Brahma-kshatriya is most probably not the correct one. I have now to consider the description of the Sen Rájás as descendants of the lunar race. It is a well-known fact that all the princes of India, whether real Kshatriyas or not, have tried to trace their descent from the solar or lunar race of that caste. Even the Rájás of Chuṭiyá Nágpur, whom Colonel Dalton very rightly thinks to be of the aboriginal Cole or Muṇḍa origin, claim to be real Rájpúts, and following their lead, the inferior landholders, who are undoubtedly aboriginal Muṇḍas, are gradually setting up claims to be Hindú Rájpúts. I found this process in full operation when I was in Chuṭiyá Nágpur three years ago. If the Sen kings belonged to the Sankara race or any of the mixed castes, is it not very likely that they would aspire to be Kshatriyas and trace their descent from the lunar race, and their panegyrist Umápati Dhar, a poet and a famous adept in the art of exaggeration, would exalt them into members of the race of the moon? Even now the Súdras of Bengal are looking up. Some time ago there was a movement among the Kayasthas for taking the *yajñopavíta* or 'the sacred thread,' on the assertion that they were originally Kshatriyas; and at the present moment there is a similar movement among the Suvarṇavarṇikas, who now claim to have been originally Vaiśyas.

In the Baqarganj plate, found by Mr. Prinsep, the title of Śankara Gauḍeśwara is repeatedly applied to the Sen Rájás. The word Gauḍeśwara, no doubt, means the king of Gaur or Bengal, but it is not easy to explain the real meaning of the word *śankara* here. It is said to be written with palatal *ś*. Dr. Mitra takes it to mean 'excellent,' but he has not shown any reason for assuming this meaning, which cannot be found in the ordinary Sanskrit dictionaries and is certainly not the commonly accepted import of the term. According to the dictionaries and the common usage of the word, it is, when a substantive, a synonym for Śiva or Mahádeva, and when an adjective, it means 'auspicious.' I find Mr. Prinsep translating the

phrase as 'the auspicious lord of Gour.' It is well known that the Sen Rájás, at least some of them, were *Saivas*, or worshippers of Siva, and the phrase may mean 'the lord of Gaur, a worshipper of Siva (Sankara).' Bnt none of these interpretations seem to me to be appropriate. I am of opinion that the word *śankara* here is an euphuism for *sankara*, with a dental *s*, and then it must mean a mixed race, a suggestion which has been noticed in Dr. Mitra's paper. This meaning will be a very appropriate one. Mistakes of a palatal *ś* for a dental one and *vice versâ* are not uncommon in the old inscriptions, and when we remember that the inscription in question was written in the Tirhút or Gaur type, which represents an intermediate stage of orthography between the Kuṭila and the modern Bengalí character, the commission of such an error is all the more likely. Srídhara Swámin, the annotator of the Bhágavata, mentions the commencement of kings of the Varṇa-sankara or the mixed castes in India in his time.

In his own work the Dánaságara,* Ballál Sen does not call the Sen dynasty Kshatriya, but applies the epithet चचचारिचचय्ये, which means 'following the practices of Kshatriyas'. So in the 6th stanza of the inscription in the copper-plate found in the Sundarbans, the epithet of राजन्यधर्म्माश्रय, which virtually means the same thing as चचचारिचचय्ये, is applied to Lachhmaṇ Sen. It therefore appears that the Sen Rájás are never distinctly described as Kshatriyas. Does not this show that they were not pure Kshatriyas but belonged to a mixed caste? If they were Kshatriyas, why is it not so stated in unequivocal terms? There is a legend current in Vikrámpur that Ballál Sen was born of a Bráhmaṇa father, the river-god Brahmaputra, who visited his mother in a dream in the form of a Bráhmaṇa. Does not this indicate the mixed nature of the Sen race?

I will now briefly consider the evidence on which the theory that the Sen Rájás were Vaidyas is based. In the various *Kulapanjikas* or genealogies of the Ghaṭaks as well as in the Laghubharata, Adisúr, Ballál Sen, and other Rájás of the Sen family have been distinctly described as members of the Vaidya caste. It is very likely that Devatívra Ghaṭaka, Kavikaṇṭhahára and other Ghaṭakas of the Varendra Bráhmaṇas, who lived about four centuries ago and composed the genealogies, knew the true caste of the Sen Rájás.

My contention is that the inscriptions of the Sen Rájás are not

* [In his *Book of Indian Eras*, p. 77, General Sir A. Cunningham ascribes this work to "Haláyudha, the spiritual adviser of Lakshmana Sena," referring as his authority to Rájá Rájendralála Mitra, in his paper on the Sena kings, in the Journal A. S, B., vol.XXXIV (1865), p. 137. But this is an error, Dr. Mitra there quotes a Sanskrit verse, ascribing the work to Ballál Sen. Ed.]

inconsistent with the genealogies of the Ghaṭakas and are therefore not opposed to tradition. I think the inscriptions support the view that the Senas were of the Varṇa Saṅkara or mixed caste. Manu recognises three classes of mixed castes: (1) *Múrdhávasikta*, or those born of Bráhmaṇa fathers and Kshatriya mothers, (2) *Ambashṭha*, those of Bráhmaṇa fathers and Vaiśya mothers, who are identical with the modern Vaidyas, and (3) *Máhishya*, born of Kshatriya fathers and Vaiśya mothers. There was no practical difference between the Ambashṭhas and Máhishyas, and Vidyábhúshaṇa, the author of *Laghubharata*, called the Máhishyas Vaidyas. He calls Víra Sen or Ádisúra, the founder of the Sen family, a Máhishya. Remembering that they were Kshatriyas on the father's side, the Máhishya or Sen Rájás of Bengal naturally traced their descent from the lunar race of Kshatriyas, and this explains the epithets in the inscriptions recently discovered. Probably the Máhishyas and Vaidyas became gradually amalgamated, and the Sen Rájás came to be regarded as Vaidyas. I am finally of opinion that the Sen Rájás were never pure Kshatriyas, nor originally Vaidyas, but were Múrdhávasiktas or Máhishyas, who were both allied to the Vaidyas. The distinction afterwards wore away, and the Senas became gradually amalgamated with the Vaidyas.

I will now proceed to describe briefly the principal ruins and objects of interest in Rámpál. I have visited them several times during my incumbency as subdivisional officer of Munshíganj, and carefully collected all the traditions and legends by which they are enlivened. First of all, I will take the Masjid of Ba-Ádam* or the mosque consecrated to the Muhammadan faqír of that name. It is a pretty large, strong, brick-built mosque with a high arched dome. The bricks are of the same small size which characterize old Muhammadan architecture. The mosque has two massive stone pillars which are apparently snatched from a Hindú temple, and which tradition identifies as the *gadás* or clubs of Ballál Sen. It is in a dilapidated state, but is worth preserving. It has a stone tablet in front which bears an Arabic inscription, a reduced facsimile of which is herewith published (see Plate V). It will be observed that it states that the mosque was built by Bádsháh Fatḥ Sháh bin Sulṭán Maḥmúd in 880 Ḥijrí or 1475 A. D. It is therefore 414 years old. The faqír to whose memory it is dedicated died, however, in 1106 A. D., (supposing Ballál Sen to have died after a reign of forty years) or 369 years before the mosque was erected.†

* [The real name of the faqír is Bábá Ádam, of which Ba-Ádam is a mere vulgar corruption; another corruption, Bábardam, is mentioned in *Arch. Survey Rep.*, vol. XV, p. 134. Ed.]

† There is a similar mosque with a somewhat similar inscription in Qází Qaṣ-

There is the following legend about the death of the faqír and the fate of Ballál Sen. There lived a Muhammadan family in Kanai Chang, a village south of 'Abdulláhpur and not far from Rámpál. The master of the house had no children. One day a faqír came and begged alms of him, but he refused alms, saying, " I will give no alms, when Alláh has not given me the boon (child) for which I am praying so long." The faqír predicted that he would beget a child and asked him to sacrifice a bull to the altar of Alláh when his desire was fulfilled. He then went away without any alms. In course of time the man had a son born to him, but the Hindús would not allow him to sacrifice a bull. He therefore repaired to the lonely jungle, south of Kanai Chang, and secretly sacrificed a bull. Taking as much meat of the bull as he and the members of his family would be able to consume, he buried the remainder under the ground and returned home. A kite, however, snatched a morsel of the flesh from him, and another kite trying to snatch it the morsel fell down in front of Rájá Ballál Sen's palace. On enquiry the king learned the whole story and ordered the child, to commemorate whose birth the bull was sacrificed, to be brought before him and killed the next day. The Muhammadan learned the king's decree and at night escaped with his wife and child and as much property as he could carry. He fled to Arabia and, meeting Ḥaẓrat Ádam, a faqír, at Mecca, told him all that had happened. Learning that there was a country in which there was no religious toleration, and people were not at liberty to practise their own religious rites, Ḥaẓrat Ádam came to Rámpál with six or seven thousand followers. Ba-Ádam is only another name for Ḥaẓrat Ádam. He began to sacrifice bulls and cows on the spot where the mosque dedicated to him now stands. Rájá Ballál Sen sent his ultimatum, asking him either to leave the country or fight with him. The faqír chose the latter alternative, and a protracted warfare took place between his followers and the king's army. The battles were indecisive for many days, and the loss of men on both sides was heavy. At last the faqír's followers were reduced to only one hundred men. One day Rájá Ballál Sen's men, while going to the market, saw the faqír alone reading Namáj (saying his prayers). The king marched to kill the faqír at this juncture, but as he was diffident of success, he constructed, before leaving his palace, a large agnikuṇḍa or funeral pyre (literally 'a pit of fire'), which still exists in the form of a large pit, and asked the women of his household to kill themselves by throwing themselves into the fire, if he was vanquished and killed. He

bah, two miles from Rámpál. It is described in page 76 of Blochmann's Contributions to the Geography and History of Bengal, (Jour. A. S. B., vol. XLII, p. 284.) [See the note at the end of this article. Ed.]

took a pigeon in his coat and proclaimed that the bird's return to the palace without him would mean his death and serve as a signal for the females of the house to perish in the flames to save their caste and chastity. Ballál Sen came to the faqír and struck him with the sword, but the faqír was invulnerable and the sword would not cut his skin. After concluding his prayers, the faqír asked Ballál what brought him there. "To kill you," replied the king. The faqír asked him whether he would embrace the Muhammadan faith or not. The king of course answered in the negative. The faqír said: "It is so ordained that I shall die at your hands. But no sword other than my own will cut me. So take this sword and kill me." Ballál took the sword thus offered and killed the faqír at one stroke. His body was cut into two parts. His head flew to Chittagong, where there is still a prayer-house consecrated to him. His body was buried at Rámpál, and the mosque was subsequently erected over his remains by the Bádsháh after the Muhammadan conquest of Bengal. After the death of the faqír, Ballál went to the tank to bathe and purify himself. As he left his gory clothes on the bank, the pigeon, unobserved, flew to the palace, and at this signal the females of the royal household threw themselves into the fire and perished. Soon finding that the pigeon had flown away, Ballál rode to his palace, but it was too late. Finding that all his family was killed and life was not worth living, he threw himself into the fire and perished in the flames.

Such is the legendary account of the death of Ballál Sen and the fall of Rámpál. The city appears to have been abandoned after his death, and I think there is a substratum of truth in the legend. It is a historical fact that the Arabs were the first race of Muhammadans who invaded Hindústán, and it is not unlikely that their missionary expeditions penetrated as far as Bengal in the eleventh century and fought the Sen kings who had no standing army. The Pál kings regained their ascendancy in this part of Bengal after the death of Ballál. It has been asserted, and not without some show of reason, that Lakshmaṇíya, after his flight from Nadiyá, took refuge in old Vikrámpur, and he and some of his descendants lived in Rámpál or Sunárgáon, and maintained their sway in this part of Bengal during the early years of Muhammadan rule. It is mentioned in the Bengalí book on the Sen Rájás of Bengal by Kailash Chandra Sinha, that probably there was a second Ballál Sen who reigned after the Muhammadan conquest. It first struck me that if there was a second Ballál Sen, he must be the prince who reigned at Rámpál and killed the faqír Ba-Ádam and afterwards himself perished in the funeral pyre, thereby putting an end to the Sen dynasty. But the theory is not based on any reliable evidence, while tradition distinctly says that the Ballál Sen who killed the faqír

was the founder of Kulinism and the most distinguished prince of the Sen dynasty.

The next object of importance is the Rámpál Dighí* or the artificial lake of Rámpál. Formerly it was about a mile long and about 500 yards broad. It is now fast silting up and remains dry for nearly half the year. Cultivators have now broken up parts of the lake and grow *boro* paddy in it. The following is the traditional account of the origin of the lake. Rájá Ballál Sen once promised to excavate a lake, as long as his mother would be able to walk in one direction without stopping, and this he undertook to do in one night, namely, the night immediately following the pedestrian performance of his mother. So one afternoon the queen-mother walked out of the palace and proceeded towards the south. After she had walked some distance, the idea suddenly crossed the king's mind, that if she walked much further, he would be unable to cut such a large lake in one night and keep his word, and if he once broke the promise he made to his mother, he would be doomed to eternal hell. After a short reflection he hit upon a dexterous device. He asked his servants to suddenly touch his mother's feet and paint them with red pigment (*alaktaka*), giving out that a leech bit her and was sucking blood. The servants did so, and the stratagem had the desired effect. The queen-mother stopped, and the point whence she returned homewards became the southernmost boundary of the lake. On that very night the king collected innumerable men and excavated the whole lake. It was so large that one bank was not visible from the other. But for a long time the lake remained dry. Guided by a dream, Rámpál, an intimate friend and, according to another account, maternal uncle of Ballál Sen, one day rode into the lake, and assembling a large number of men on its banks, asked them to call it after his name, when it was filled with water. As soon as he entered into the lake, water streamed up from beneath and filled it in a moment. But Rámpál vanished. Everybody cried: 'Rámpál, Rámpál,' but he could no more be seen. Since that time the lake is called Rámpál Dighí.

This explanation of the genesis of the lake's name never satisfied me. Rámpál is also the name of Ballál Sen's city. Is it not very strange that Ballál's city and the largest lake he excavated should be named after an obscure person unknown to history? Rámpál is certainly the name of a person and is analogous to the names of Bhím Pál and other Pál kings of Bengal. I conjecture that he was a king of the Pál dynasty which reigned at Rámpál after the death of Ballál Sen, and that it was he and not Ballál who excavated the lake, and the city and the lake have been named after him. To the north of the Búṛhí-

* Rámpál Dighí or the artificial lake of Rámpál.

Gangá there are still many ruins to show that the Pál kings reigned in that part of Bengal, and it is a historical fact that they flourished both before and after the Sen dynasty. But as they were Buddhists ruling over a population, the mass of which were Hindús, their names have not been handed down to posterity with that halo of glory which surrounds the Sen kings, who were orthodox Hindús and great patrons of Bráhmans and Brahmanical learning. Again, it is a well known fact that one of the characteristics of the Pál kings was to excavate large lakes and tanks wherever they lived. The Mahipál Dighí, still existing in Dinájpur, is perhaps the largest lake they cut in Bengal. For all these reasons I am of opinion that the prince who gave his name to the city and lake of Rámpál was a king of the Pál dynasty.

There is another but smaller lake in Rámpál. It is called the Kodál-dhoá (the spade-washing) Dighí. It is about 700 cubits by 500 cubits, and is still very deep. Tradition has it that when the excavation of the Rámpál Dighí was over, each digger scooped out a spadeful of earth from a place close by, and thus the Kodál-dhoa Dighí was made. The story of course is fiction pure and simple, invented to show that myriads of men were engaged to excavate the Rámpál Dighí.

The next object of interest is Bárí Ballál Sen or Ballál Sen's palace. It is a very large and high mound of earth, surrounded by a deep moat, about 400 yards by 300 yards. No architectural remains are visible. The cicerones point to a large black pit inside the ruins as the Agnikuṇḍa or funeral pyre in which perished Ballál Sen and his family.

Another object of interest in Rámpál is the everlasting Gajariyá tree. It is a large living tree standing on the north bank of Rámpál Dighí. It is about 100 cubits high and has two large straight stems. Trees of this species abound in this part of Bengal, and there is nothing peculiar in its appearance: only it shows no signs of age or decay, though it is undoubtedly very old. It is said to be immortal and existing from the time of Ballál Sen. Respectable men of seventy and eighty years of age, whose testimony I am unable to disbelieve, have told me that they saw the tree in its present state of growth from their very boyhood. The tree is certainly a botanical curiosity. It is held in high veneration by the Hindús, and various stories are current about its virtues and sanctity. It is worshipped by the women, particularly by the barren ones, who besmear it with oil and vermilion in hopes of being cured of barrenness. A faqír is said to have violated its sanctity by cutting a root, but he instantly vomited blood and died. No one would now venture to tear a leaf or lop off a branch. A small fair is annually held under the sacred tree on the eighth day of the moon in the month of

Chaitra, when it is worshipped by pilgrims from various parts of the subdivision.

The following legend explains the origin of the Gajariyá tree's immortality. It was at first in a decayed state and was used for tying Ballál Sen's elephants. One morning some hermits (Ṛishis) presented themselves before Ballál Sen's gate to confer a boon on the king as a reward for his piety. They sent their message to the king by his door-keeper. The man went in and returning said that the king was smoking and was unable to come out that instant. After awhile he was again sent in. This time he returned with the news that the king was besmearing his body with oil. The door-keeper was sent in again and again, but he always returned with some excuse or other for the king's inability to come out and receive them. Once the man found the king bathing, and again taking his noontide meal, and the third time taking his siesta. He never communicated the message to the king, but only went in to observe whether he had leisure to come out. Disgusted with the king, the hermits left the palace, but at the time of departure they blessed the Gajariyá tree and conferred on it the boon of immortality which was originally intended for the king. Instantly the tree showed signs of vitality. Leaves and blossoms sprouted forth in every direction, and the people were struck with awe. The king came out shortly afterwards and, being apprised of the news, immediately sent for the hermits. But it was too late. The hermits had vanished.

There is a comparatively small tank in the south-west part of Rámpál, which deserves a passing notice. It is called Rájá Haris Chandra's Dighí. It is overgrown with trees and shrubs which are flooded over with water for a week once a year at the time of the full moon in the month of Mágh. Before and after this period the tank is dry. I have as yet received no satisfactory explanation of the phenomenon. The tank is said to have been excavated by Rájá Haris Chandra, probably one of the kings of the Pál dynasty.

There is a mosque called Qáẓí's Masjid not far from Ba-Ádam's. It is an ordinary plain-looking prayer mosque, which was certainly erected after that of Ba-Ádam. It boasts of no inscription, but has several stone idols of Hindú gods and goddesses in its verandah, which the proprietors have evidently preserved as trophies of Islám. The present Qáẓí of the mosque showed me a firman of the Emperor 'Álamgír, granting lands for the benefit of the institution; but I cannot vouch for its genuineness.

There are two roads the construction of which is attributed to Ballál Sen. The one connects the river Dhaleśwarí on the north with the Padma on the south, and the other goes in a different direction from

Rámpál right up to the Padma. The latter is called Kachkí Dwarja. The roads are now overgrown with trees and shrubs, and have in many places been broken up by the cultivators' plough, but what still remains clearly shows that they were once spacious roads as wide as thirty cubits. I once proposed to utilize the first mentioned road in constructiug one from Munshíganj to the Police outpost at Rájabárí, a distance of about twelve miles, but it was found impracticable. The Kachkí Dwarja is named after the fish of that name. The astrologers had predicted, so the story runs, that Rájá Ballál Sen would die of bones of fish sticking in his throat. To avoid such an unnatural and painful death, the king refrained from eating any fish, except the kachkí which was devoid of bones. He therefore constructed the road to the Padma, to enable fishermen to supply his table daily with the boneless fish.

[Note by the Editor.—The inscription, of which a reduced facsimile, based on three ink impressions, is published in Plate V, reads as follows:

Line 1:—قَال اللهُ تَعالىٰ و انّ الْمَساجد لله فلا تدعوا مع الله احداً قَال النبيّ صُلى اللهُ عليه وسلم مَن بنيٰ مسجداً في الدُّنيا بنيٰ اللهُ له قصراً في الجنة بنيٰ هذا الْمَسجِد

Line 2:—الجامع الملك المعظم ملك كافور في زمان السلطان ابن السُّلطان جلال الدّنيا و الدّين ابوالمظفر فتحشاه السلطان ابن محمود شاه السلطان في تاريخ اوسط شهر رجب سنة ثما و ثمانين ثمنماية

It is dated "in the middle of the month of Rajab in the year 888 A. H., during the reign of Jalálu-d-dín Fatḥ Sháh." Mr. Gupta reads the date as "the 2nd day of Rajab 880," on the authority of a Maulawí of Dacca, who deciphered the inscription for him. But this is certainly wrong. The date can be quite clearly read. It is expressed in words: above سنة *sanat* there is ثما *ṣamá;* by the side of *sanat*, to the left, there is ثمانين *ṣamánín;* above *samánín* again is ثمنماية *ṣamanamiyat* (sic); below the latter word is one و *waw*, and below *ṣamánín* is the other و *waw* of the date. Thus the whole reads *sanat samá wa samánín wa samánamiyat*, *i. e.*, eight and eighty and eight hundred. Nor does the date specify "the 2nd day," but simply says اوسط *ausaṭ* or "the middle."

On comparing this inscription with that published by Blochmann in this Journal for 1873, Vol. XLII, p. 284, there can be no doubt that the two inscriptions are identical. There are, indeed, three slight divergences. In the date Mr. Blochmann reads ثمان but the inscription has only ثما (without the final *nún*). This is apparently a mere blunder

of the engraver, who seems to have forgotten to incise it. Possibly the wrong reading of the date as 880 may have been caused by this faulty legend. He also reads أمانية whereas in the inscription the word is really spelt امنماية (without the first *alif*). Again Mr. Blochmann reads الله له مثله في whereas the inscription really has الله له قصرًا في. But there can be no doubt that these three divergences are the mere result of an oversight. As may be seen by referring to the numerous similar inscriptions, published by Blochmann in vol. XLII of the Journal, it is the word قصرًا (not مثله) that is uniformly used in them; and there is no difficulty in recognising it on the facsimile of the present inscription.

Mr. Gupta, in his footnote (pp. 17, 18) says: "There is a similar mosque with a somewhat similar inscription in Qází Qasbah, two miles from Rámpál," and he is disposed to identify this inscription with that published by Blochmann. This identification is quite untenable. I have obtained four impressions of this second inscription, three through Mr. Gupta, and one through Maulawí Abul Khair Muhammad Siddiq, the Superintendent of the Dacca Madrasah. Unfortunately the inscription is too badly preserved to be wholly read, but luckily the date is sufficiently legible to show that the month is Zi-l-Qa'dah, and and that the year is expressed in *figures* as well as in words. The figures are 976. This is quite sufficient to preclude the identification of this inscription with that published by Blochmann. Moreover this inscription is incised in three lines, while that of the Ádam Shahíd mosque, published by Blochmann and now republished by Mr. Gupta, occupies only two lines. In fact, Mr. Gupta was misled by an error in Blochmann's account, or rather by an error of Dr. Wise, whose account Blochmann quotes. Dr. Wise says that "the Masjid of Ádam Shahíd is in Bikrámpur, at a village, called Qází Qasbah, within two miles of Balálbárí, the residence of Ballál Sen." But this is quite wrong; the mosque is not "two miles from the Balálbárí," but only "about half a mile to the north of it," as General Sir A. Cunningham, from whom Blochmann received the inscription, distinctly states (see his *Arch. Surv. Rep.*, Vol. XV, p. 134). It, therefore, occupies the precise position described by Mr. Gupta. Dr. Wise, in his account,—it is clear,—confused two mosques, one of Ádam Shahíd at Rámpál, and another placed by him and Mr. Gupta at Qází Qasbah. The exact locality of the latter mosque, however, would seem to be the Rikábí Bazár, to judge from Maulawí Abul Khair's letter, quoted below. There are four mosques in or near Qází Qásbah, and these four mosques seem to have been more or less confused by the several writers on the subject: and the confusion probably arose from the circumstance that Qází Qasbah is a name applied to a large area, apparently including the localities of all four mosques.

In order to clear up the matter as much as possible, Maulawí Abul Khair, at my request, was good enough personally to visit the different localities and himself procure impressions of the two inscriptions. I subjoin the substance of his interesting letter.

"As arranged I went yesterday to Munshíganj to see the mosque at Qáẓí Qaṣbah. I took with me as my guide a man who proved to be not so well acquainted with the locality as I expected. He had informed me that there was another old mosque at Rikábíbazár [No. I] which was close to the *ghát* where we were to land from the steamer. We landed at about 11O'Cl. and proceeded to the latter mosque. We found it to be in a dilapidated condition, though there were signs of its being used as a prayer-house. It appeared to have been an edifice of elegant structure with a floor, 15 cubits square, and one dome. The bricks are all polished and carved, and the corners and edges are so neat that from a distance they seem to be stones. The cement used is a whitish substance, not ordinary súrkhí and lime, but perhaps powdered stone and lime, or something else. There was no inscription in the mosque, but on enquiry we learnt that the stone was removed and placed in another mosque [No. II] in the neighbourhood recently built. There we repaired and found the inscription. The stone not being good many of the letters are corroded, and are not decipherable. I have taken an impression, however, which I send to you in a separate cover for whatever use you may think fit to make of it. It is dated seven hundred and odd, which I could not read. The name of the month is Ẕi-l-Qa'dah.

"We then proceeded towards Qáẓí Qaṣbah, and after a tedious journey reached the mosque [No. III]. My disappointment was great when I found that the mosque, though old, did not present any interesting feature, the construction being of an ordinary type, no ornamentation or elegance having been attempted. Besides there was no inscription; the stone I was informed had been removed by the Collector of Dacca, during the proceeding of a lawsuit between rival claimants to some land belonging to the mosque. The only interesting thing that we found there was a Hindú idol, carved out of a block of stone, lying with the face downward and forming a step to the verandah of the mosque. I had become so fatigued that I feared I would not be able to return to the ghát without some sort of conveyance. But none was available. I was, however, informed that the route we had taken was a circuitous one, and that the ghát would not be very far from that place by a short-cut through Rámpál. I further learnt that we would pass by the mosque of Bábá Ádam [No. IV]. This news somewhat enlivened me, and I was on my legs again. We passed by the famous Ballálbárí, of which I saw the ditch about a hundred yards wide. The Ballálbárí or palace of

Ballál Sen seems to have been an entrenched fortress of which only the trench and some ruins now remain as a memorial. Not far from this I found the tomb of Ádam Shahíd or Bábá Ádam and the mosque [No. IV]. This edifice is also in ruins, but presents an interesting view to the archæologist or antiquary. The structure is of the some style as that of the mosque at Rikábíbazár [No. I], but more exquisite and ornamental. The cement is of the same nature, the bricks polished and carved. The roof consists of six domes supported by two stone pillars in the middle of the hall. One of the domes does not exist, and another has partly fallen down. The pillars are monoliths of a whitish stone, which always "perspire," and lead ignorant people to associate superstitious ideas with them, as they see water flow down on their surface, and feel them very cold. I saw marks of red pigment on the pillars, which I heard were put there by Hindú women, (and I believe by Musalmán women too, though the Khádim denied this) on making vows for the attainment of some object. The stone bearing the inscription is placed very high, so that it could not be distinctly read. I discovered, however, that the copy I have sent to you was only of one line, there being another line above it of which no impression was sent to me. As it was already very late in the afternoon and I could not wait for a scaffolding being put up, I could not obtain an impression. The inscription published by Blochmann is, I believe, of this mosque, and he was not very wrong in giving the name of the place as Qáẓí Qaṣbah ; for Qáẓí Qaṣbah extends over a large area, and the place where this mosque stands is also included within it. This fact decides the dispute as to the name of the place being given by Blochmann as Qáẓí Qaṣbah and by Bábú Asutosh Gupta as Rámpál. It may be called by four different names, *viz.*, Qáẓí Qaṣbah, Rámpál, Ballálbáṛí and Durgábáṛí. The inscription is quite legible, no letters have been destroyed or mutilated, the stone being jet black and well polished, not liable to corrosion. The Khádims showed me twelve places in the interior of the mosque, where, they said, lay twelve stones of great value which were removed by Mags during an incursion into Bengal in remote ages. These stones, they said, shone in the darkness of the night and illuminated the hall! Some things have been dug out of the walls, no doubt, but whether they were stones of great value which shone in darkness I cannot vouch. This mosque at any rate is an object of interest to the antiquarian."

From another letter of his, I may quote the following passages:

"The mosque at Qáẓí Qaṣbah [No. III] is not known as the mosque of Bábá Ádam or Ádam Shahíd. It is called Qáẓí Báṛí mosque. Ballálbáṛí is situated near the mosque [No. II] of Ádam Shahíd and not near Qáẓí Qaṣbah ; and Ballál Báṛí and Rámpál are only two names of the

same place. There is no one's tomb near the mosque of Qáẓí Qaṣbah. As for the inscription, no one can say what it contained. The other mosque, of course, is called after Bábá Ádam or Ádam Shahíd and is situated in Durgábáṛí, which is close to Rámpál or Ballálbáṛí, at a distance of about half a mile. And Ballálbáṛí and Durgábáṛí both stand at a distance of a mile from Qáẓí Qaṣbah. The tomb and the mosque are lying unrepaired. Some religious man has the charge of the mosque, and prayers are said therein. The mosque has two domes between which there are two stone pillars one on each side. There is no courtyard outside the mosque. The mosque of Qáẓí Qaṣbah [No. III] also has two domes but no courtyard and pillars. There are stones at the threshold carved into images and placed overturned."

I have numbered the mosques in the above quoted extracts by corresponding numerals.

No. I. Mosque of Rikábí Bazár; a beautiful structure, similar to the mosque of Ádam Shahíd at Rámpál (No. IV); with only one dome; its inscription, dated in the month Ẕi-l-Qa'dah 976 A. H., removed to mosque No. II. It is the mosque referred to in Mr. Gupta's footnote (p. 17), as situated "in Qáẓí Qaṣbah, two miles from Rámpál;" it is also apparently the mosque, said by Dr. White to be "within two miles of Ballálbáṛí at a village called Qáẓí Qaṣbah" and erroneously called by him the Ádam Shahíd mosque (No. IV).

No. II. A mosque recently built near mosque No. I; contains the inscription belonging to No. I.

No. III. An ordinary plain mosque, with domes, but with no pillars, also with Hindú carved images in the floor of the verandah; its inscription removed to Dacca; referred to by Mr. Gupta towards the end of his paper (p. 22).

No. IV. Mosque of Ádam Shahíd, close to Rámpál, at the distance of about half a mile; a highly ornamental structure, resembling the Rikábí Bazár mosque (No. I); with the inscription (Plate V) dated "in the middle of Rajab, 888 A. H., in the reign of Jalálu-d-dín Fatḥ Sháh;" described by Dr. White (quoted by Blochmann) in Journal A. S. B., Vol. XLII, p. 285, General Sir A. Cunningham in Arch. Survey Reports, Vol. XV, p. 135, and Maulawí Abul Khair, as possessing *six* domes, of which, according to Dr. White, *three*, but according to Maulawí Abul Khair only *two* have fallen in, while General Sir A. Cunningham does not notice the destruction of any of them. On the other hand, Mr. Gupta, who describes it as a "brick built mosque with a high arched dome," would seem to allow it only *one* dome. In that case, he would seem to have confused it with the mosque (No. I) at Rikábí Bazár, which Maulawí Abul Khair states to have only one dome.]

*The Namuchi-myth; or an attempt to explain the text of Rigveda* viii. 14. 13.—*By* CHARLES R. LANMAN, Professor in Harvard College, Cambridge, Mass., U. S. A.

The fact has been recognized, ever since the earliest days of Vedic study, that the myths of the Veda are the poetic outgrowth of certain natural phenomena. The fact appears, for example, from the work of Yáska, when he quotes the opinion of his predecessors. And the natural basis of any given myth is usually not difficult to ascertain. Such, however, is not the case with the one now in question. The text cited above reads:

अपां फेनेन नमुचेः
शिर इन्द्रोदवर्तयः।
विश्वा यदजय स्पृधः॥

It is commonly understood and rendered as follows: 'With the foam of the waters, Namuchi's head, O Indra, thou didst cut off, when thou wast conquering all thy foes.'

There is no doubt about the incorrectness of this interpretation. Nevertheless it is an exceedingly ancient one, as appears from the legends into which this brief allusion of the Vedic Saṃhitá is expanded in the Bráhmaṇas. From the Bráhmaṇa-passages* and from the explicit language of Sáyaṇa†, it is clear that the water-foam was conceived as the actual weapon with which Indra cut off the demon's head. The fable says that Indra used this most remarkable weapon because he had sworn to Namuchi, saying, "Neither by day nor by night will I slay thee, neither with the mace nor with the bow, ... neither with the dry nor with the wet." And so, in order to slay him, without perjuring himself, Indra smote the demon at twilight, which was neither day nor night, and with the foam of the water, which was neither dry nor wet. 'He cast the water-foam into (the shape of) a thunderbolt'—**अपां फेनं वज्रमसिञ्चत्**—literally, 'The water-foam he made by pouring or founding (as molten metal) to be a bolt.'

All this is quite in keeping with the style of the Bráhmaṇas; and it follows naturally enough from the text of the Saṃhitá, provided we misunderstand it as did the authors of the Bráhmaṇas. But to my mind there is no conceivable natural phenomenon of which this may be re-

* See Çatapatha Br., xii. 7. 3; Táittiríya Br., i. 7. 1. These passages, with one from the Mahábhárata, are conveniently assembled by Muir, in his *Sanskrit Texts*, iv². 261.

† फेनेन तस्य शिरश्चिच्छेद..,अपां फेनेन वज्रीभूतेन॥

garded as the mythical reflex. We are therefore led to inquire, did not the words of the sacred text mean something different from what even the ancients themselves supposed them to mean? I believe that they did and that the misunderstanding can be accounted for.

I suggest that the Vedic text be translated: 'With water-foam Namuchi's head, O Indra, thou didst cause to fly asunder, when thou wast conquering all thy foes.' This appears to me intelligible if we assume that the natural phenomenon to which it refers is a waterspout ('*trombe*') on an inland lake. How, now, does this view accord with the natural facts in question and with a strict verbal exegesis of the text?

Major Sherwill has given a description of Bengal waterspouts in the Journal of this Society for 1860, volume XXIX., p. 366 f., along with some excellent pictures. And in a German work of Th. Reye, entitled *Die Wirbelstürme*, p. 17 f., further information and pictorial illustration may be found. The waterspout is of course an object of terror, and it is most natural that it should be personified as a demon. The verb वर्तयितुम् means 'cause to rotate,' and the motion is qualified as upward and outward motion by the preposition उद्. The compound उद्वर्तयः means accordingly, 'thou didst cause to move upward and outward or to fly asunder with a gyratory or centrifugal motion.' It is not possible to express by one simple English phrase the ideas involved in the compound; but they seem to me to be quite simple in themselves and to follow unforced from the Sanskrit and to be thoroughly suitable for the not infrequent phenomenon of a waterspout as seen by unscientific eyes. The head of the column is twisted and made to burst asunder and scatter itself 'with foam' (फेनेन, as an instrumental of accompaniment), *i. e.*, in abundant foamy masses. Then, with the dispersion of the column, often comes (see Sherwill, p. 370, Reye, p. 32) a heavy rain. This is all in entire accord with the usual representations of gracious Indra's deeds of prowess.

In particular, also, it accords most strikingly with the quite differently expressed idea of Rigveda v. 30. 8*b* (= vi. 20. 6*b*), where Indra is spoken of as 'twirling (like a stick of attrition or like a churning-stick) the head of the demon Namuchi,'

शिरो दासस्य नमुचेर्मथायन्।

and that, immediately after the couplet in stanza 7,

अधा दासस्य नमुचेः शिरो यत्
अवर्तयो मनवे गातुमिच्छन्।

This explanation of the stanza in question, moreover, harmonizes well with the succeeding stanza, Rigveda, viii. 14. 14,

मायाभिरुत्सिस्रप्वत
इद्र यामारुरुक्षतः ।
अव दस्यूँरधनुथाः ॥

in which Indra is praised for hurling down the demons that were striving with magic wiles to creep up and to scale the heights of heaven. To the poetic fancy, nothing would suggest more naturally the idea of demons trying to scale the heavens than the sight of this strange magical ladder betwixt earth and sky.

In this connection, the discussion of Bergaigne, *La religion védique*, ii. 346-7, should be compared. The language of the śloka at Mahábhárata, v. 10. 37 = 328 seems also to favor my view. The whole epic passage is a reminiscence of the Namuchi-story.

The false interpretation of the ancients, finally, rests simply upon the ambiguity of the instrumental case form फेनेन. The case might denote the relation of accompaniment—as it really does here; or it might denote the relation of means—as the authors of the Bráhmaṇas supposed it to do.

*On some new or rare Muhammadan and Hindú Coins.—By* Dr. A. F. Rudolf Hoernle.

In July and September last I received from the Deputy Commissioner of Hoshangábád, in two instalments, a hoard of 477 gold coins, which had been found in a field in the Soházpur Taḥsíl of the Hoshangábád District, by some ploughmen while ploughing their field.

This hoard was carefully examined by me, and a detailed report published in the *Proceedings* of the Society for December 1887.

Among the 477 coins, there were 451 belonging to different (so-called) "Paṭhán" emperors of Dehlí; 4 belonging to the Mughal emperors Aurangzíb and Farrukh Siyar, 1 belonging to the Bengal king Sikandar bin Ilyás, and 21 silver-gilt forgeries.

The "Paṭhán" emperors of whom there were coins, are Ghiyáṣu-d-dín Balban (1 specimen), Muizzu-d-dín Kaiqobád (1), Jalálu-d-dín Fírúz (1), 'Aláu-d-dín Muḥammad (391), Ghiyáṣu-d-Tughlaq I. (3), Muḥammad bin Tughlaq (24), Fírúz Sháh (19), Fírúz Sháh and Fatḥ Khán (2), Fírúz Sháh and Ẓafar (2), Ghiyáṣu-d-dín Tughlaq II. (2), Abú Bakr bin Ẓafar (1), Muḥammad bin Fírúz (1), Maḥmúd bin Muḥammad bin Fírúz (1), and Maḥmúd bin Muḥammad bin Tughlaq (1).

Most of these coins belong to more or less well-known types, which have been already published in Thomas' *Chronicles of the Paṭhán Kings*

*of Dehli.* See details in the report above referred to. It will be seen from that report, that in the present hoard there are several types of coins which were still noted as "unique" in Thomas' book; *e. g.*, the coin of Jalálu-d-din Fírúz (Chron. No. 120), several of Muḥammad bin Tughlaq (Chron. Nos. 172, 179), one of Fírúz Sháh (Chron. No 226), one of Fírúz Sháh and Ẓafar (Chron. No. 245). There are in it also some coins, which are not to be found in Thomas' *Chronicles*, though they have been published elsewhere: thus two of Maḥmúd bin Muḥammad bin Fírúz (with *Abu-l-Muẓaffar*, as published by myself, in this Journal, vol. LII, p. 213, for 1883), and one of Maḥmúd bin Muḥammad bin Tughlaq (published by Mr. Delmerick in this Journal, vol. XLIII, p. 97, for 1874).

The most important in this collection of "Paṭhán" coins, however, are five, which, to the best of my knowledge, are unique, or at least have never been noticed or published. These are the following (see Plate IV):

1, One coin of Muḥammad bin Tughlaq (Plate IV, No. 1). It reads as follows:

| Obv. | Rev. |
|---|---|
| الحاكم بامر الله | ابو العبّاس احمد ٥ |

The reverse seems to bear a date, consisting of two numerals. One of them, 5, is distinctly seen by the side of *abú;* but the other above the *s* of *'Abbás* is obscure. As the Khalíf Abu-l-Abbás Aḥmad reigned from 741-753, the date of the coin can only be 745. This coin has some similarity with Muḥammad bin Tughlaq's copper coin, No. 218 in Thomas' *Chronicles.*

2, Two coins of Ghiyáṣu-d-dín Tughlaq II. He is mentioned in Thomas' *Chronicles*, as the twenty-first king (A. H. 790-791 = A. D. 1388). He reigned only a few months, as the rival of Muḥammad bin Fírúz and Abu Bakr. Thomas' *Chronicles* only notice "silver and copper" coins of his (p. 302). The present collection contains two gold coins of his, of two different types. The first (Plate IV, No. 2) reads as follows:

| Obv. | Rev. |
|---|---|
| السُّلطَان الاعظم | فى زمن الاعام |
| غياث الدُّنيا و الدين | امير المومنين |
| تغلق شاه | ابي عبدالله |
| السلطاني | خلدت خلافته |

Margin: on reverse: [ ٧ ] ٩١ دهلي .....

It was struck at Delhí, in the year 791. The mint is distinct on the margin, but the date is only partially preserved. There can be no doubt, however, of its being a coin of Tughlaq II., and not of Tughlaq I., on account of the mention of the Khalíf Abi 'Abdulláh. This Khalíf only ascended the throne in 763 A. H., while Tughlaq I. died already in 725 A. H. Abi 'Abdulláh's Khalífat lasted, with interruptions, down to 808 A. H. This identification I owe to Mr. Chas. J. Rodgers, of the Archæological Survey, to whom I showed the coin.

The second (Pl. IV, No. 3) reads as follows :

| Obv. | Rev. |
|---|---|
| غياث الدنيا | المتوكل على |
| و الدين ناصر | الله ابو المظفر |
| امير المومنين | تغلق شاه |

Margin, on reverse : illegible.

This coin is also shown to be one of Tughlaq II., by the mention of the Khalíf Al Mutawakkal 'Alí Alláh, who is the same as the above mentioned Abi 'Abdulláh. The execution of this coin is rather crude, especially of the word Abu-l-Muẓaffar.

3, One coin of Abú Bakr, the son of Ẓafar Khán and grandson of Fírúz Sháh. He succeeded Tughlaq II., but only reigned for a little more than a year, from 791 to 792 A. H. In Thomas' *Chronicles* (p. 303) he is noticed as the twenty-second king, but only copper or silver copper coins of his are described. The present collection contains one gold coin, which reads as follows (Plate IV, No. 4) :

| Obv. | Rev. |
|---|---|
| السُلطان الاعظم | في زمن الامام |
| ابو بكر شاه بن ظفر | امير المومنين |
| بن فيروز شاه | ابي عبدالله |
| السلطاني | خلدت خلافته |

There are faint traces of a margin on the reverse, which probably gave the mint and date.

4, One coin of Sikandar bin Ilyás, one of the independent kings of Bengal. For some account of him, see this Journal, vol. XXXVI, p. 58, and vol. XLII, p. 256. So far as I am aware, only silver coins of his have hitherto been discovered; they have been described and figured by E. Thomas, in vol. XXXVI. The coin in the present collection is of gold, and reads as follows (Plate IV, No. 5) :

| Obv. | Rev. |
|---|---|
| الامام | يمين خليفه |
| الاعظم ابو | الله ناصر امير |
| المجاهد سكندر | المومنين خلد |
| شاه ابن الياس | الله ملكه |
| شاه السلطان | فتنه |

There was a margin on the reverse, which probably contained the mint and date, but it is quite mutilated. The readings are identical, and their arrangement nearly identical, with those on Thomas' type No. 4 (or coin, No. 22) in vol. XXXVI, p. 64. The mint, accordingly, would seem to have been Fírúzábád.

To these five coins I add another which is not new, as it has been already described by Thomas in his *Chronicles*, p. 298. But I am not aware that it has ever been figured; and the present specimen has the further advantage of having preserved a portion of the margin on the reverse, giving the mint and date. It is a coin bearing the joint names of Fírúz Sháh and his son Fatḥ Khán, and reads as follows (Plate IV, No. 6):

| Obv. | Rev. |
|---|---|
| ٥ شاه ٦ | في زمان الامام |
| فتحخان فيروز | امير المومنين |
| مدّ الله ظلال | ابوالفتح المعتضد الله |
| جلاله | خلدت خلافته |

Margin: on reverse: ..... في سنه احد ..... كه .....

Fatḥ Khán was made co-regent in 760 A. H., and the Khalíf Abu-l-Fatḥ whose name appears on the reverse, reigned from 753-763 A. H. It follows that the date of the coin, of which only the numeral 1 is preserved, must be 761. The name of the mint I am unable to read.

I take this opportunity to publish figures of two copper coins of Saifu-d-dín al Hasan Qurlagh. They belong to the well-known "Bull and Horseman" type, already noticed by Thomas in his *Chronicles*, p. 96 (No. 82). They show on the obverse a horseman with the legend, in Nágarí characters, श्री हमीरः *S'rí Hamíraḥ;* and on the reverse a humped bull, also with a Nágarí legend. The latter, as given by Thomas, is श्री हसण कुरल *S'rí Hasaṇa Kurala;* and this is, no doubt, the style in which it is met with in by far the greater majority of specimens. But occasionally the name is found in full कुरलक *Kurlaka.* Among a number of 100 of these coins, discovered not long ago in Sháhpúr in the Panjáb, and examined by me, I found about a dozen giving the full name (see

*Proceedings* for December 1888). On Plate IV, I give the reverses of four specimens (Nos. 7—10). No. 7 shows the usual form कुरल *kurala*, but No. 8 has distinctly कुरलक *kuralaka* (the ल *l* is slightly injured); No. 9 reads श्री हसण कु *S'rí Hasaṇa Ku*, and No. 10 has श्री हसण कुरल *S'rí Hasaṇa Kurala.*

I also take this opportunity to publish two gold coins (Plate IV, fig. 11, 12) which I found among a lot of 506 coins collected by Bábú P. C. Mukherjí, on special duty with Archæological Survey, and forwarded to the Indian Museum in Calcutta. They belong to the class commonly known as 'Kanauj coins.' Coins of this description were issued by the Kulachuri kings of Chedi, the Gahaṛwáṛ (Raṭhor) kings of Kanauj and the Chandel kings of Khajuraha. As the two coins, here published, are said to have been found in Khajuraha, I think it most probable that they are Chandel coins, though I feel uncertain as to their exact attribution.

No. 11—I propose to read.

| | |
|---|---|
| श्री मत्प | *S'rí Mat Pa-* |
| रमर्द्दि | *ramarddi* |
| देव | *Deva* |

No. 12—may be read.

| | | | | |
|---|---|---|---|---|
| श्री मद्वी | *S'rí Mat Ví-* | or | श्री मद्बा | *S'rí Mat Bá-* |
| रवम्म | *ra Varmma** | | लवम्म * | *la Varmma** |
| * देवी | * *Deví* | | * देवी | * *Deví* |

The final long *í* of *deví* seems clear; but it is puzzling.

The king to whom No. 12 belongs, I take to be the 20th of General Sir A. Cunningham's list of Chandel kings (*Archæological Survey Reports*, Vol. XXI, p. 80), *viz.* Víra Varmma, who reigned from about 1240—1280 A. D. Or it might be Bála Varmma, mentioned by Mr. V. A. Smith in his paper on the "History of Bundelkhand" (Journal, B. A. S., Vol. L, p. 19); but he appears to have been only one of the younger scions of the regal house, and would not have been entitled to issue coins in his name.

No. 11 I take to belong to the well-known Paramárddi Deva (the 18th of Gen. Sir A. Cunningham's list), who reigned from about 1165—1203 A. D., and fought with the famous Prithví Ráj and Quṭbu-d-dín Aibak.

If my attributions are correct, both the coins now published would appear to be unique. For the only Chandel coins hitherto known and published, so far as I am aware, are those noticed by Gen. Sir A. Cunningham in his *Archæological Survey Reports*, Vol. X, pp. 25—27 (see his Plate X). They belong to the following five Chandel princes: Kírti Varma (12th of the list), Hallakshaṇa Varma (13th), Jaya Varma

(14th), Prithví Varma (16th), Madana Varma (17th). Then follows Paramarddi Varma (18th), a coin of whom is now published for the first time. I may note, however, that Gen. Sir A. Cunningham's coins, Nos. 15 and 16 on his Plate X (Vol. X), appear to show some resemblance to my No. 12. They too seem to read *devi*. They are marked on his Plate as "unknown."

# JOURNAL

OF THE

# ASIATIC SOCIETY OF BENGAL.

## Part I.—HISTORY, LITERATURE, &c.

## No. II.—1889.


*Life of Sum-pa Khan-po, also styled Yeśes-Dpal-hbyor, the author of the Reḥumig (Chronological Table.)*—*By* BÁBÚ SARAT CHANDRA DÁS, C. I. E.

This great Lama was born in the year 1702 A. D. (*Tree-monkey* of the 12th cycle of 60 years) at a place in the neighbourhood of the *D*gon-luñ monastery of Amdo in ulterior Tibet. He is better known by his family name of Sum-pa, which means one from the country of Sum, a province in Western Tibet. In his infancy he is said to have given indications of his identifying himself with the spirit of his predecessor. While very young he learnt to read and write with extraordinary facility. He became well known by the name of Sumpa-Shab*s*-druñ. He was admitted into the monastery of *D*gon-luñ in the 9th year of his age. He received instruction in the sacred literature of the Buddhists under *L*chan-skya Rinpo-chhe Ñag-*D*vañ chho*s* *l*dan) and Thu Kwan chho*s* kyi*r*gya-*m*tsho and other great Lamas. From *L*chañ-*s*kya he received the vows of monkhood, who gave him the name Yeśes *D*pal *h*byor. He studied metaphysics, logic, rhetoric, poetry, Buddhist liturgy, ritual, and the dogmatical and theoretical differences of the various Buddhist schools. He also learnt arithmetic, medicine, the science of vocal music, the works on Sútras and Tantras, and the art of sacred painting. With the acquisition of all this learning he was occupied till the twentieth year of his age. In addition to acquiring all the virtues and talents of his predecessor, he gained the highest proficiency in astronomy, astrology and the science

of figures. His fame of learning surpassed that of all other Lamas of his age in Tibet, China, and Mongolia. In the twentieth year of his age he visited Tibet proper, and took his admission as a student in the monastery of *H*bras-*s*Púñ (Dapúñ). In the year 1725 he visited *G*tsañ, where he took the final vows of monkhood from Panchhen *B*lo-*l*ssañ Yeśes. In the 22nd year of his age he went on a pilgrimage to Lhokha with a view to visit Sam-yea, and the famous sanctuaries of Yarluñ, where he was very much pleased with an interview with *R*gya *l*sras Rinpochhe (Ñag *D*vañ Hjig*s* me*d*). *R*gyal-sras is said to have explained to him in a prophetic manner what he was destined to achieve and how he should proceed to Amdo, for the purpose of founding monasteries and temples there, and also for diffusing Buddhism in China. In his 23rd year he was appointed *M*Khanpo (abbot) of *S*go Mañ in *H*bras spuñ. In the following year, when a dispute arose between the two provinces *D*vus and Gtsañ, he persistently declined to allow the monks of his college to take up arms against their enemies, as it was an act prohibited by the laws of Buddhism. The monks of other colleges followed his example and desisted from fighting. He filled the chair of *S*go-mañ for a period of five years, after which he returned to Amdo. In the 30th year of his age, in pursuance of the prediction of *R*gyal-sras, he founded the monastery of *B*shad *S*grub-*g*liñ with about eighty monks. He brought the recluse hermitage of *B*sam.*g*tan-*g*liñ ri-khro*d* with fifteen monks, which was founded by *D*pal *l*Dan *hod* sser, under his own monastery, and afterwards called it by the name of Sum-pa rikro*d*. At the age of thirty-four, at the command of the emperor Chhin-luñ (divine protector), and in the 2nd year of his reign, he visited China. Both *L*chan *s*kya Ro*l*-pa*h*i *r*Dorje and he were presented to the emperor, who asked them many questions on religious matters. Sumpa Khanpo is said to have answered all of them without any difficulty whatever. Pleased with him the emperor commanded that he be appointed the spiritual guide of all the chiefs of Mongolia, and he also conferred on him a high sacerdotal rank by letters patent, and authorized him to bear the title of Huthogtu (saint). The Lama respectfully accepted all the imperial favours, with the exception of the title of Huthogtu which honour he respectfully declined, according to him it being intended for those who aspired to worldly glory. The emperor was struck with the Lama's indifference to such a high honour, and remarked that within his vast empire he did not know one who like him could look with indifference at such an exalted distinction. Henceforth he rose high in the esteem of the emperor and was declared to be a real Lama. He resided in China for nine years. The emperor occasionally used to call him to his presence. The *L*chan *s*kya, who presided at the head of Labrang (church), commanded that all

the Tibetan books on Buddhism extant in China should be revised by Sumpa, which he did to the great satisfaction of all. He therefore gave him the clerical title of Ertené (precious) Paṇḍita. He presented him with a diploma inscribed on a yellow scarf. Once on every month the emperor used to give him audience and converse with him on religious matters for several hours. He resided for five years in Peking, during which time he enjoyed the esteem and the veneration of the Manchu and the Mongol residents and the pilgrims of Peking. At the time of his return to Amḍo, which he performed viâ Dolonor and Khar *s*ñonpo he received considerable presents from the emperor, *L*chañ-*s*kya and the great Wangs (chiefs) of China and Mongolia. At Rivo-*r*tse *l*ña (Woo-thai) he stayed one year in order to perform religious worship in the great sanctuary of Manju Ghosha. In his northward journey he visited Alaksha, receiving immense presents from the Mongols, whence he proceeded to *D*gon-luñ. Being indifferent to worldly comforts, he did not like much ostentation, and consequently kept few retainers and servants. In the 43rd year of his age he was appointed to the headship of *D*gon-luñ monastery. Out of the immense wealth he had acquired in China and Mongolia he used to send large presents to the Panchhen and Dalai Lamas, to the great monasteries of Sera, *H*bras-spuñ, *D*ga*h* *l*dan, *B*kra śi*s* lhunpo, &c. He also set up innumerable Buddhist images, inscriptions and *chhortens* &c. His works are voluminous and many. Being dissatisfied with the existing works on astronomy, astrology and chronology of Tibet, he wrote a dissertation on them after collating 20 works by different authors. He found the works of *M*khas-grub *r*je and Bu-stoñ to be more correct than others. He died at the age of 73. The following are his principal works:

Kun-*g*sal meloñ (on arithmetic, astronomy and astrology) a large volume written in very small characters.

*B*du*d* *r*tsi thig-pa (drops of nectar) on medicine.

Lag-len (practice) of medicine, &c.

S'e*l*-*d*kar meloñ (crystal mirror) on diagnosis.

*G*so-*d*pya*d*.

*S*ku-gsruñ thug-*r*tan *d*kyil thig tsha*d* (structure, proportion and form of images, diagrams, symbols, &c.).

*S*gra, *S*ñan-ñag and ssl*o*s gar (rhetoric and poetry and drama).

*R*gya-Bo*d* and Hor Chhos *h*byuñ (*L*jon-*b*ssañ), *i. e.* the history of Buddhism (rise and progress of Buddhism) in India, China and Tibet. This work was completed in the year 1747 A. D., and also contains the "Re*h*umig (chronological table).

A work on Buddhist charms to enable men to work miracles.

Hdsamgliñ *S*pyi *b*śa*d* (general account of the world) on the geography of the world.

A work on Yoga.
A work on fortune telling and divination.
A work on meditation.

## REHUMIG.*

*(Translation.)*

CYCLE†—I

A. D. 1026.

The twelfth *Kulika* emperor, called Súrya, ascended the throne of Sambhala. *D*ge *bśes* Potova Rinchhen *g*sal was born. Gyi-jo Lo-cháva translated the *Kála-chakra* system of astronomy for introducing it into Tibet. The year of the Buddha's Nirvána being fixed in the year called *Fire-hare*, this year (1026) was the 361st year of the period of *Adhi-dṛishṭi*. According to the calculation of those who place the Buddha's death in the year *Iron-dragon*, this was the 408th year of *Adhi-dṛishṭi*. A. D. 1026

According to some writers the work, called Dus-*h*khor *h*grel-chhen, was translated in Tibet by Gyi-jo Lochàva in the year 1027

Se-*s*ton Kun-rig*s*, the spiritual teacher of Ma-chig Sha-ma *l*cham Sriñ and pupil of *h*Brog-mi Lo-cháva, was born. 1028

Phu chhuñ-va *g*shon-*r*gyan was born. 1030

Rinchhen *s*ñiñ-po of *S*tod luñ, the pupil of *S*pyan-*s*ña-va was born. 1031

*S*pyan *S*ña-tshul khrim*s* *h*bar was born. 1032

*H*khon *D*kon-*m*chhog *r*gyal-po of *S*a-*s*kya was born. 1033

La-chhen (*b*Lama Chhenpo) *D*Goñ*g*s-pa rab *g*sal proceeded to the mansion of purity (died). 1034

Rñog Chho*s*-*r*Dorje, the disciple of Marpa, was born. 1035

Jovo *r*je *D*pal *l*dan Atíśa arrived at *M*Ña*h* rig*s*. 1038

*R*je-*b*tsun Milara*s*-pa was born. Bari Lo-cháva Rinchhen-grag*s* was born. The Shalu monastery was founded. Náro Pan-chhen died. 1039

Ye-*ś*e*s* *h*bar of *S*ne*h*u ssur, the eldest son of *D*gonpa-pa was born. *M*ñar *s*gom *br*tson *h*grus hbar of *S*myug rum, who was the pupil of *S*pyan *s*na-pa, was born. Atíśa visited great Tibet (according to some) in the 61st year of his age. 1041

* The italics in the proper nouns are not pronounced.

† The Vṛihaspati Cycle of 60 years was introduced into Tibet by the Indian Pandit Chandra Nátha in the year 1025 A. D.

The monastery of Myu-gu luñ was founded by *H*brogmi Lo-châva. A. D. 1042

Machig Sha-ma's husband was born. *R*ma-Lo-cháva Chhos *h*bar of La-sto*d* was born. *H*Brom met Atíśa in the 41st year of his age. 1043

*H*briñ *S*ton of *R*gyal was born. Ssla-va grags-pa, the son of *L*che dal sgañpa, was born.

Chhag-khri *m*chhog met Atíśa. 1044

*R*gya-*h*dul *h*dsin *d*wañ phyug tshul-khrims *h*bar was born. Atíśa miraculously witnessed the religious service performed by Maitreya (Byams-pa) and Manjuśrí (*H*jam-*d*wyañs) at *s*Ne-thañ. 1046

Mu-dra-va founded the monastery of E-*d*gon. 1048

*G*ñal chhos *h*bar was born. *H*brom made his first presents to Atíśa. 1049

Atíśa wrote his work on the Buddhist chronology. 1050

Machig Lab sgron of Kham-pa Luñ was born. Machig yumo became the pupil of *S*ba-sgom ye-byañ and others of the later *R*ñiñ-ma school. Dharma Bodhi was born. 1051

*S*diñ-po snubs Chhos-*h*bar was born. 1052

*R*dorje Senge of *G*lañ-ri thañ (Potova's disciple) was born. Lama *g*shen, the pupil of Roñssom Locháva Chhos-*b*ssañ, was born. Atíśa died at the age of 73. 1053

Pá-tsha-va Locháva called Ñima Grags-pa was born. *R*ma-sgom chhos gśes of the Shi-bye*d* school was born. Shiñ ston chhos *h*bar was born. The celebrated Machig Lab-*S*gron was born. Rinchhen *b*ssañpo the great Locháva died. 1054

Trepo *m*chhogs, the spiritual teacher and *M*khanpo of *R*ñog legs, was born. 1055

Sher-ho*d* of Shañg Kama was born. The monastery of Rva sgreñ was founded by *H*brom ston-pa. 1056

Chhag-khri-*m*chhog, one of the disciples of Atíśa, died. 1057

*R*ñog *B*lo-*l*dan śes-rab was born. Dol bu śer-*r*gya-ma was born. Rog-*d*mar-shur was born. 1058

*R*ma-bya *R*na-ra-va of *r*G*y*al was born. *S*na-nam *r*dor *d*wañ of Shañ died. 1059

Machig receives spiritual instruction from A-ston. 1060

*S*khor-chhuñ of Phyag chhen school was born. Ma-chig Shama, the pupil of Se-ston Kun-rigs, was born. So-chhuñ *D*ge-*h*dun *h*bar of the Shi-bye*d* school was born. Kun-*d*gah, the second of the Shi-bye*d* school, was born. 1061

Se-*m*khar-chhuñpa (of Lam-*h*bras-pa) held the monastery of *L*ñog*m*-khar-chuñ. *H*brom ston died. 1063

A. D.

*R*nal-*h*byor Ame held the headship of Rwa-Sgreṅ. 1064

*R*gy-agar Phyag-na visited the Ye-raṅ monastery in Nepal. 1065

Pa*d*ma byaṅ-chhub of S'a-po *s*gaṅ, the pupil of Phu-chhuṅ-pa, was born. Byaṅ-chhub ye*ś*es of *R*gyal-tsha was born.

*H*Jam-*D*pal and *S*kyi khuṅ-pa Hab-jo, the two disciples of the Grub thob Yumo, were born. *H*dsa*d* Dharma met Pha-dampa Sa*n*s *r*gya*s*. *L*che-*S*gom Naṅ-pa unearthed the concealed scriptural treasures of *L*che-b tsun, the *R*ñiṅ-ma Lama. 1066

Chho*s* kyi *R*gyal-po of *H*khon-phu, the brother of Machig S'ama, was born. 1068

S'arava Yontan Grag*s*, the disciple of Potova, was born. 1069

*H*khon founded the grand monastery of *S*a-*s*kya, and *R*ñog leg*s* *ś*es founded the monastery of *G*saṅ-phu. *R*ma-Chho*s* *ś*es met Pha-dampa. 1072

*S*gro-phu*g*-pa, the pupil of Ssur-chhuṅ and disciple of *D*ka*h*-*b*shi, was born. *H*brog-mi Locháva died. S'er-grag*s*, the *R*ñiṅ-ma Lama of Ssur-chhuṅ, died. 1073

*S*prul-*s*ku Gshon-*hod* of Bya-yul, the disciple of *S*pyan-*s*ña, was born. *S'es*-rab *Br*tson of Khu was born. *Br*tson *g*yuṅ Khu-chhen died. 1074

The great religious institution of king *M*ña*h* *b*dag *r*tse *s*de was founded. *R*dog Locháva visited Kaśmír. 1075

Gtsaṅ-pa Rin-po chhe, the disciple of Bya-yul-pa, was born. Nam kha *r*dor*j*e was born Pá-tshab *s*gompa, the disciple of Kun *d*ga*h* of the Shi bye*d* school was born. Milara*s*pa proceeded to study under Marpa Locháva. 1076

*H*brom-*s*ton of *R*gya*l* was born. *S*gro-chho*s* *br*tson, the pupil of *S*gom of the Shi-bye*d*-pa school, was born.

After the death of Ame*s*, *M*dso*d* *d*gon-pa became the abbot of Rva-*s*greṅ. 1077

*B*lo-gro*s* grag*s* Lha-*r*je *s*gampopa of Dwag-po was born. 1078

*R*gya-*h*du*l* *h*dsin practised the ascetic vows of *vinaya* at the monastery of *D*ga*h*-va-*g*doṅ. 1079

The foundation of the monastery of Gra-thaṅ was laid by Gra-pa *m*ñon *ś*es chan (a certain monk who was possessed of foreknowledge). 1080

Potova Rinchhen *g*sal died, after discharging the functions of abbot at the religious seat of Rwa-*s*greṅ for one year or (according to some) three years. *M*dso*d* *d*gon-pa died. 1081

Henceforth for many years there prevailed a religious anarchy at Rv-*s*greṅ. 1082

Byaṅ chhub *dge-mdses*, the pupil of *Sne-hu* ssur-pa, was born. *Ras* chhuṅ *rdor* grags, the pupil of Milaras-pa, was born at Guṅ thaṅ. Milaras-pa performed asceticism to attain sainthood. A. D. 1083

S'ami sgom-pa *Smon* lam *hbar*, the pupil of So-chhuṅ-pa, was born. 1084

## CYCLE—II.

S'arava attended on Potova as his pupil. 1086

Ma Locháva Chhos-*hbar* died of poison. 1088

*Dgyer Sgom* chhenpo *Gshon-grags*, the pupil of Bya-Yul, was born. *Rñog-mdo-sde*, the spiritual son of *Rñog* Chhos-*rdor*, was born. Tshul-*hphags*-dan lapa, the Buddhist scholar, was born. Rog *śes*-rab *blama*, the spiritual successor of *Rgyal*-wa *rten*-nas, was born. Gra-pa *mñon śes*-rab chan died. 1089

*Brtson hgrus hbar*, known as Bya-*hdul*-va *hdsin*-pa (the Vinayic priest of Bya), was born. 1090

Sa-chhen Kun *sñiṅ*, the son of Sa-*skya Dkon rgyal*, recognised as the 9th spiritual emanation of Chanrassig, was born. The saint Pha-dampa visited Tibet. *Rûog* Lo-cháva returned to Tibet. 1091

The *Glaṅ*-thaṅ monastery was founded by *Glaṅ*-ri-thaṅ-pa. Milaraspa, after the completion of his ascetical propitiations (attainment of sainthood), proceeded towards Tesi &c. 1092

Ñiṅ phug-pa Chhos *grags*, the saint of Shaṅ who was the pupil of Byaṅ-sems Ssla *rgyan*, was born.

The *Rñiṅ* Lama, called *Rgya*-nag-pa (the Chinese), was born. Ras-chhuṅ-pa met Milaras-pa. 1093

The monastery of Lo*dgon* was founded. 1094

Tshul-khrims *dpal*, the red cap Lama, was born. 1095

*Bkra śis rdorje* of Shaṅ *Ston*, a *Rñiṅ*-ma Lama, was born. Marpa *Chhos blo* was born. 1096

*Hod* sser seṅ-ge, the disciple of Bya-yul-pa, was born. Dva gs-po Chhos *gyuṅ*, the chief spiritual son of *Sgampo*, was born. 1099

Ye-*rdor* of *Hchhad* kha, the disciple of S'arava, was born. Pha-dampa visited China. 1100

On the demise of *Hkhon-ston Dkon-mChhog rgyal*-po, Bari Locháva ascended the throne of Sa-*skya*.

On the death of Glan-tshul byaṅ, *Hbriṅ ston* succeeded to the headship of *RGyal* (became abbot of *Rgyal*).

*Rñog* Chhos *rdor* died. 1101

*Stab* ka-va Darma *grags*, the disciple of S'arava, was born.

Khyuñ tshañ Tho*d*-*d*mar-va was born. *S*to*d* luñ-pa founded the monastery of *B*tson-gro *d*Gonpa. *S*pyan *s*ña tshu*l* *h*bar died at *S*ñug-rûm. *S*gro*l* *S*gom, the pupil of *S*gampo, was born. 1102

*S*gam-po-va received the final vows of monkhood. 1103

Potova rinchhen *g*sa*l* died. 1104

*G*tum-*s*ton *B*lo gro*s* grag*s*, the pupil of S'arava, was born. Phu-Chhûñ-va died at the monastery of Poto *d*gon. 1105

*S*teñ-pa Lo cháva who brought the Kaśmírian Pandit Alañka Deva was born. 1106

Chho*s*-señ of Phya-pa was born. After the death of *R*nog Locháva Shañ-Tshe sriñ Chho*s* kyi *b*lama held the headship of *G*sañ-phu for thirty-two years. A succession of twelve lamas occupied a period of 159 years. *S*ñug-rum-pa chhenpo died. 1108

*R*dorje *r*gya*l*-po (Phagmo-grub-pa) was born. Karma du*s* *g*sum *m*khyanpa was born. *S*gampo served Milara*s*-pa as his pupil. 1109

Kun-*s*ñiñ ascended the throne of Sa-*s*kya. The Gva-gor-*d*gon-pa was founded by *G*ñal Chho*s* *h*bar. 1110

At Chhu-bar Milara*s*-pa triumphed over a troop of demons. *S*gampo performed ascetic propitiations at *Ho*l kha. *G*ña*l* Chho*s* *h*bar died. 1111

The final visit of Pha-dampa to Tibet. The incarnations of La*s* chhen Kun-*r*gya*l*, &c., founded monasteries in Bya-yu*l*. 1112

Khyuñ tshañ ye*ś*e*s* *b*lama, the disciple of Ra*s* chhuñ, was born. Jo-tshu*l* S'e*s*, the spiritual son of *R*ñog *m*do-*s*de, was born. Kham luñpa Chhenpo, the pupil of *H*grom, died. 1114

*S*gompa tshu*l* Khrim*s* of Dvag-po was born. *R*gya*l*-va ye-grag*s* *d*mar-va was born. *S*to*d* Luñpa Chhenpo died. Se-*s*ton Kun rig*s* died. 1116

*H*Chhu*s* dar *b*rtson, the disciple of *S*gro (of the Shi bye*d* school), was born. Some of the *G*ter-*s*ton of the *S*ñiñ ma sect discovered hidden books. Pha dampa died. 1117

Ma Khro-phu *R*gya*l*-tsha, the disciple of Paṇchhen S'ákya śrí, *R*ñog-*m*do-*s*de and Phag-gru, &c., was born. Ye*ś*e*s* *h*bar of *S*ne*h*u Ssur died. 1118

*D*gyer *s*gom founded the monastery of *R*gya-ma Rin-chhen *s*gañ-*r*ñiñ.

*H*briñ-*s*ton died. *S*kam ye-*r*gyan of the *S*hi-bye*d* school died. 1119

Thog-me*d* grag*s*, the spiritual son of *R*ñog *m*do-*s*de, was born. *R*ma *R*na-ra-va became the abbot of *R*gya*l*. The age of Samádhi commenced. 1120

Chhos *r*gyan of Se-*s*kyi*l*bu, the disciple of *H*chha*d* ká, was born.

The monastery of *S*gampoi *d*gonpa was founded by Dvag*s* po Lha-*r*Je. 1120

Thog*s* me*d* *Hod* of *R*ñog was born. *Br*tson-grag*s* of Shaṅ was born. When Skor-chhuṅ died, his body received animation. The resurrection was due to the Indian saint Nirupa having entered it in a miraculous manner. 1121

Ssla-ho*d*, the spiritual son of *H*khon-phu-pa, was born. *G*yubrag pa was born. *G*shon-b*r*tson of *G*laṅ-luṅ, the pupil of Bya-yu*l* Locháva, was born. *R*je Milara*s* chhen died.

*R*do-rje seṅge of *G*laṅ thaṅ died. 1122

Jo *H*bum, the father of *R*ta-*s*ton Jo-ye and Jo-*b*so*d* of the *R*ñiṅ-ma school, was born. The later Kun-*d*ga*h* of the Shi-bye*d* school died. 1123

Karma du*s* *m*khyen was admited into the order of monkhood by Tre-po *m*chhog *b*lama. Achârya Abhayakara died. 1142

Mal Kapa chan, the disciple of S'ama, was born. *L*che-*s*ton yon-tan *g*ssuṅ*s* of Se-brag was born. 1125

The Kaśmírian Pandit S'ákya S'rí was born.

*H*jig-*r*ten Grag*s*-pa *R*gya-va *r*ten, who became the disciple of Pá-tshab *s*gom-pa of the Shi-bye*d* school, was born. *Hod* *h*jo *g*shon-nu yontan was born.

The 13th Rig*s*-*l*dan (Kulika), called *S*na-tshog*s* *g*ssug*s* (Viśva-rúpa), ascended the throne of S'ambhala. 1126

*D*ge-*b*śe*s* *g*lan of *R*gya*l* was born. Pa*d*ma-*r*dorje Ra*s*-pa (he with locks) of the *H*brug-pa school, was born.

Karma du*s* *m*khyen visited *D*vus. So-chhuṅ *d*ge *h*bar died. 1127

*S*bal-te *D*gra *b*chom-pa, the saint of Balti, was born. Jo *h*o*d* *g*chuṅ, also called *R*ñog jo va-soṅ, was born. *R*ma Narava died. 1128

S'e*s* rab Byaṅ-chhub, also called Dvag*s* po *S*gom-Chhuṅ, of Dvag*s*-po was born.

*R*gya*l* tsha Byaṅ ye*s*e*s* became abbot of *R*gya*l* *g*dansa. *S*nub*s* chhos *h*bar died. 1129

Karmapa S'e*s*-rab *h*o*d* of Shaṅ died. *R*gya-*h*du*l* *h*dsin-pa died. S'a-vo-*s*gaṅ-pa died. S'e*s* rab *r*gyam of Do*l* died. 1130

The red cap Lama Tshu*l* khrim*s* *h*bar died. 1131

Nam-*m*kha*h* *h*o*d* of the red cap school, who was the re-embodiment of Shva *r*mar Tshu*l* *d*pal, was born.

Du*s* *m*khyen received the final vows of monkhood from Mal *h*du*l* *h*dsin. 1132

*S*gampo *h*dul *h*dsin was born. *S*gro-phugpa died. 1133

*M*ñah *b*dag Ñañral, king of Tibet (recognised as the 11th incarnation of Chanrassig), was born. 1134

*Hod* sser Señge founded the monastery of Khrom Kam *d*gonpa at Khrom *G*sher. 1136

Sañs *r*gyas *d*pon-pa, the younger brother of *R*gyama *d*gyer *s*gom, was born. Shon-*h*byuñ was born. Rog *b*kra grags, the spiritual son of Rog S'es-rab *b*lama, was born. *G*shon-*h*od of Bya-yul died. 1137

Dus *M*khyen visited *S*gampo at Dvagpo. Khyuñ-po died. *R*gyal-tshab Byañ yeśes died. 1138

*H*brom *s*ton of *R*gyal became abbot of *R*gyal *g*dansa. 1139

S'arava yontan grags died. 1140

*B*sod nams *r*tse-mo, the spiritual son of Sa-skya Kun-sñiñ, was born.

*B*kraśis *d*pal of Thañ-pa chhenpo in *S*tag-luñ was born. 1141

*H*jig-*r*ten *g*sum *m*gon Rin *b*ssañ the governor of Hbri-goñ, was born. After the death of *H*brom-*s*ton of *R*gyal, the abbotship of *G*dansa remained vacant for nine years. Ár spent his summer recess at *G*dansa. Khu-śer *b*rtson died. 1142

*D*gyer *s*gom tshul señ, the disciple of Mal Ka-va chan and Phag-gru, was born.

*G*sañ *s*ton *s*pyipa chaspa, one of the Pan chhen of Sa-skya, was born. 1143

*H*khonphu-pa, the brother of Ma chig S'ama, died. 1144

*R*ñog jo *b*sod died.

*R*gyal Chharmo, the spiritual son of *R*ñog thog me*d*, was born. *R*ñogjo *Hod* died. 1145

## CYCLE III.

*R*je-*b*tsun Grags-pa *r*gyal-*m*tshan, the spiritual son of Sachhen, was born. 1146

Kun-*l*dan Ras Chhuñ, the younger brother of Khro-phu *r*gyal-tsha, was born.

*R*ñiñ-ma *R*gya-nag-pa, the disciple of *S*gro-phug *R*ñiñ-ma Lama, died. 1147

Shig-pa *b*du*d* *r*tsi, the disciple of *R*ñiñ ma Se-brag, was born. Machig S'ama died. 1148

Rog S'es-rab *b*lama, the religious and ministerial successor of *R*gyal-va-*r*ten-na, was born.

Dvagpo *s*gom-tshul held the abbotship of *S*gampo. *D*pal-chhen *Hod*po chhe, the son of Sa-chhen, was born. 1149

Phagmo grub-pa interviewed *R*je-*S*gampo-va. 1150

*R*dor-señ, the younger brother of *R*ñog Chharmo, was born. *S*gro chhos *br*tson died. 1151

Chhag Locháva, also called *D*gra-*b*chom *R*te*h*u rava, the disciple of *S*teñ-pa Locháva, was born.

Gro-*b*du*d*-*r*tsi grag*s* of *S*narthañ was born. *G*tum-*s*ton founded the monastery of *s*Nar thañ. Dag-pa *ś*e*s* tsu*l* Phag*s*-paof Ñan lam became abbot of *R*gya*l* *g*dansa.

Dvag*s*po *S*gampo-va died. 1152

*R*dorje tshu*l* khrims of *H*bri goñ was born. Dvag*s*-po *S*gom-tshu*l* founded the monastery of *M*tshur-lha luñ at *S*to*d*-luñ. 1153

Du*s* *m*khan pa founded the *Karmapa* monastery of *G*shu *m*tshur Lha luñ at *G*shu*h*i gru *b*shi Lha luñ. 1154

Thog*s* me*d* grag*s* of *R*ñog died. 1155

Kun *d*ga*h* *r*dorje, the spiritual son of *R*ñog jo-tshu*l*, was born. 1156

*D*vañ-phyug byañ rin of Lha luñ, who was the disciple of Se-*s*pyi*l*-pa, was born. *B*ssañ mo, the spiritual son of *S*añ*s* *r*gya*s* *d*pon *s*ton, was born.

Ñiñ *h*bum, the son of *R*ñiñ-ma shañ-*s*ton, was born. Pá-tshab *s*gompa died. Sa-chhen Kun-*s*ñiñ died. *R*ñog jo-tshu*l* died. Phag gru-pa founded the monastery of *G*dansa *m*thi*l*. 1157

*B*so*d* nam*s* *r*tse mo became the grand hierarch of Sa-*s*kya. *D*ge-*b*ś*es* Ñanlampa died. Dus *m*kyen founded the monastery of *M*tshur-phu. 1158

San*s*-*r*gya*s* *s*gompa *r*dor *g*shon of Bya-yu*l* was born. *D*ge-*b*ś*es* *l*chañ rib was born.

*R*ma Locháva and Yañ *d*nenpa, the immanations of Machig S'ama, were born. 1159

Ye*ś*e*s* *r*dorje (also called *g*tsañ-pa *R*gya ra*s* pa), the disciple of *H*brug-pa *g*liñ ra*s*pa, was born. *G*tsañ rinpochhe Nam *r*dorje died. Ra*s*-chhuñpa died. 1160

Chhiñgis Khán, the conqueror, who turned the wheel of might, was born.

*S*kor Nirúpa tava died. 1161

*R*ta *s*ton jo ye*ś*e*s*, the *R*ñiñ ma Lama, was born. 1162

*G*ño*s* *R*gya*l*-va lha nañva *S*añ*s* rin, the disciple of *S*kyob-pa, was born.

Du*s* *m*khyen founded the monastery of lower Kam-po *g*na*s* nañ. The monastery of Hchha*d*-ka *g*sarma was founded by *S*e-*s*kyi*l*-pa. Khyuñ-tshañ Tho*d* *d*mar became abbot of *R*gya*l*-gdansa. Hab jo Sra*s*, the disciple of Yumo, died. 1163

Bya-*h*chhañ-kha-pa founded the monastery of Malgro Bya-*h*chhañ kha. The two *G*liñras-pa of *S*tagluñ interviewed Phag-gru.

S'er-*hod*, the son of Rog *b*kra-grags, was born. 1164

*G*tum-*s*ton died at Chhos-luñ. *R*dor-ston. S'er grags became abbot of *S*Narthañ.

*R*ñog *m*do-sde died. S'er ho*d*, the spiritual son of Rog-*b*kra Grags, was born. 1165

*M*ña*h*ri *d*ge-*m*dsas died. Shañ *s*ton *b*kra *r*dor, the *R*ñiñ-ma lama, died. The abbot of *H*bri-goñ became the disciple of Phag-gru. 1166

Jo-*b*so*d* of *D*vus, who was the younger brother of *R*ta-ston-jo-ye (*R*ñiñ-ma Lama), was born.

*H*dse*d* Dharmabodhi died. 1167

*G*yam *b*ssañ Chhos *s*mon lam, the disciple of Ssva-ra-va *S*kal-ye, the son of Phag-gru, was born.

The Kashmírian Pandit S'akya S'rí took the final vows of monkhood. The monastery of *H*do*d* spañ phug was founded by Dus-mkhyen. The monastery of Skyor luñ was founded by Spal-te. Dvags*p*o *s*gom-tshul died, after which the abbotship remained vacant for two years. Phyá-pa Chhos señ died. 1168

*B*so*d* *r*dor of *S*bom-brag, the disciple of Karma sañs *r*gyas Ras-chhen, was born.

*R*gyal died at Phag-gru, and the abbotship of *S*dan-sa remained vacant for six years.

Khrom *g*śer died at Kam kam. 1169

Rin-chhen S'esrab, the younger brother of Rog S'erab ho*d*, was born.

S'ami *s*mon lam *h*bar died. 1170

Grags *r*gyan-pa ascended the throne of the Sa-skya hierarchy. *S*'er byañ was appointed to the abbotship left vacant by *S*gampo. 1171

Khro-phu Lo-cháva Tshul-śes byams *d*pal, who was a nephew of the Khro-phu *R*gyal tsha brothers, was born. Rog S'esrab lama died. 1172

Darma grags pa of *S*tabs-ka died. Jo-*h*bum, the *R*ñiñma lama, died. 1173

Rinchhen *Hod*, the disciple of Phag-gru, was born. The monastery of Tshal was founded. Bya-*h*chha*d* kapa died. 1174

Chhos *r*je *S*gañ-pa was born. Khyuñ tshañ yes'es Lama died. 1175

*D*Pon ras dar señ of the middle Hbrug school was born. The *S*kyob-pa (hierarch) of *H*bri-goñ received the final vows of

monkhood. Shañ Lo-cháva grub-*d*pal died. Dvags-po Chhos *g*yuñ died. 1176

Sans *r*gyas *s*gompa of *S*narthañ was born. Ye-grags *d*mar became the abbot of *R*gyal-*g*dan sa. 1178

*G*shon *r*dor of *M*gar dampa Chhos *s*diñ, the disciple of Skyob-pa, was born. *H*bom *d*gon S'esrab *d*pal, the disciple of *S*tag luñ-pa, was born. The monastery of *S*tag luñ *d*gon was founded by Lama *S*tag luñ-thañ-pa. 1179

Sa-*s*kya Panchhen, the son of *D*pal-*hod* sros, was born. *B*sod *r*gyan of Ko-brag was born.

The monastery of *R*gyama Rin *s*gañ was rebuilt by Sans *r*gyas *d*von-ston. 1180

*R*sod nams *r*tshe of Sa-*s*kya died. Lha-*b*tsun ssla *Hod* of *H*khon-phu died.

*R*ñog Chharmo died. 1181

Ssañs tsha *b*sod *r*gyan, the younger brother of Sa-*s*kya Panchhen Kun *d*gah *r*gyal-*m*tshan, was born. 1183

The monastery of Karma lha *s*deñ was founded by Dus *m*khyen-pa.

*R*do *s*ton śer grags died at *S*narthañ and was succeeded by Shañ *b*tsum *r*dor *hod* who was born in the year *iron-horse*. 1184

The venerable Hgro-va*hi* *m*gonpo *d*vañ phyug *Hod* Lha-luñ *d*pon sras was born.

Grags *r*gyal, of Kharagpa, who was the spiritual son of *R*god-tshañ the *H*brug-pa Lama and disciple of Bhuriba, was born. Ñiñ phug-pa died. Rog *B*kra śis grags died. 1185

*D*von S'er *h*byuñ, the disciple of *S*kyob-pa, was born. *B*loras *d*vañ *b*rtsoñ of lower *H*brug, who was the disciple of Glsañ *r*gyara, was born. The monastery of Tshal guñ thañ was founded by Lama Shañ *b*rtson grags. The image Lhachhen was constructed. *R*gyal-va yeśes died at Grags *d*mar. 1186

*H*brug-pa *g*liñ ras pa Padma-*d*orje was born. 1187

*B*sam *g*liñ-pa, the disciple of Gañ-ba and spiritual son of Karma dus *m*khyen, was born.

*R*gos tshañ *m*gon-po *r*dorje of upper *H*brug, who became the disciple of *R*gya ras, was born.

*D*ge-*b*śes Glan *r*gyal became the head of *G*dan-sa (chief seat of the hierarchy).

The monastery of *M*tshur-phu was founded by Dus *m*khyen-pa.

Hor Chhiñ-gis became king of the Mongols. Se-*spyil* len-pa died. 1188

The king of upper Mo-*r*tse *R*gyal-po presented the Lord Buddha's image with a golden crown.

*H*chhad-ka monastery was governed by Lhaluñ *d*vañ phyug of Se-spyil.

King Chhiñgis conquered Man-churia. *S*teñ-ba Lo-cháva (Tshul-khrim *h*hyuñ *g*nas) died. 1189

Ssím rinpochhe of Bya-yul (San*s*-*r*gyas *S*ton-pa grag*s*) was born. Rin *m*gon *s*ku yal-va of *S*tag luñ *d*von kar was born.

*G*lan died and was succeeded by *D*ge-*b*śes dri-*h*dul at *R*gyal *G*dansa. 1190

King Chhiñ-gis conquered Solon country. *M*chhus dar *b*rtson died. 1191

*S*kysa-*s*ton byañ rin pochhe held the abbotship of *R*gyab-*g*dansa. Lama shañ died at Guñ thañ. Karma Du*s* *g*sum *m*khyen-pa died. *G*shon-un *b*rtson *h*grus of *G*lañ-luñ died. Dvu*s*-pa died. 1192

Henceforth Chhiñ gis became emperor of China. *S*nas-thañ Shañ *b*tsun-died and was succeeded by Groms chhe-be who was born in the year *water-bird*. 1193

Bya-*s*kyuñ-pa (*m*do-*s*de *m*gon of Phorog), who was kobrag-paś disciple, was born. Khro-Lo-cháva visited Nepal. Chhiñ gis conquered Tartary. Khro-phu *r*gya*l*-tsha died. Yon-tan *g*ssañ*s* (*R*ñiñma Lama) died. 1194

Jo *h*bar, the son of Ñima-*h*bum (*R*ñiñ-ma Lama), was born. Chiñgis subdued the Danmag. 1195

The latter Chho*s* *r*je *d*pal Chhag was born. 1196

*S*kyob-pa and *S*tag liñ-ba built temples at Phag-gru. Khro Lo-cháva invited Mitrapa to Tibet who after a staying there for 18 months returned to India. Chhiñ-gis conquered Kherañ. Jo*b*so*d* (*R*ñiñ-ma Lama) died. 1197

Dvag*s*-po grol-*s*gom died. Shva-*d*mar nam *hod* died. *R*ñiñ-ma-pa Shig-po died. 1198

*S*gam-po *s*ñi *s*gam-chhen-po was born. *B*kra-Grag*s*, the re-embodiment of the red-cap Lama called Nam-*hod* who was a disciple of Du*s* *m*khyen, was born. *G*shon-señ of the middle *H*brug-pa school was born. Khro-Lo-cháva brought Buddha Śrí to Tibet. Chhiñ-gis subjugated Na*h*imanpa Ta-ge. 1199

*D*ge-*b*śhes *l*chañ-ri held the abbotship of *R*gya*l* *g*dan-sa. San*s* *r*gya*s* *s*gom-pa protected the Lo-cháva of Bya yul. *G*ssi *b*rji*d* Grag*s*, the spiritual son of *R*ñog kun *r*dor was born. 1200

*S*pyan *s*ña Rinchhen *L*dan, the disciple of Ko-brag-pa and Yuñ *d*gonpa, was born. Chhiñ-gis conquered the whole of *H*or. 1201

*R*gva Lo-cháva (*R*nam *r*gyal *R*dorje) of Roñ was born. Phag-gru Thog-*r*dug pa was born. Sans *r*gyas yar byon S'es rab *b*lama of *S*tag luñ was born.

Sans *r*gyas *ras* pa Rinchhen *s*monlam, the disciple of Shi-bye*d* pa Rog shig-po, was born.

Sa-*s*kya *d*pal-chhen *Hod* died. 1202

Karma Bakshi Chhos *h*dsin, the disciple of *S*bom-brag-pa and pupil of Karma Ras chhen, was born. Khro Lo-cháva brought the Kashmírian Pandit S'akya S'rí to Tibet.

Chhiñ-gís subjugated Harilig. *D*gyer-tshul Señ died. 1203

*R*gyal-po *d*gah, the younger brother of *R*ñog *G*ssi-brji*d*, was born. The monastery of *B*de-va-chan at *S*ñe-thañ was founded by *R*gya-*h*chhiñ rupa, the disciple of *G*ñal shañ.

His nephews, Sañs *r*gyas *d*pal and others, managed the monastery after his death. 1204

The monastery of *G*yam *b*ssañ *d*gon-pa was founded by Chhos *S*mon lam of *G*yam *b*ssañ. 1205

Chhiñgis visited Tibet and subjugated all its provinces with the exception of Mi-ñag.

## CYCLE IV.

Ssvara-yeseñ, the pupil of Phag-gru, died. 1206

*S*pyan-*s*na grags *h*byuñ became the abbot of Phag-gru *G*dansa which dignity he held for twenty-seven years. Saskya Paṇḍita received the final vows of monkhood from S'akya S'rí Paṇḍita. 1207

*D*von *d*karva occupied the abbotship vacated in consequence of the death of *S*tag luñ thañ-pa. *R*gya-ma Sans *r*gyas *d*von *s*ton died. 1209

Tilla *r*dor grag*s*, the younger brother of *H*bri-goñ-pa, was born.

*D*von-po Dar señ became abbot of *H*brug Raluñ after the death of *G*tsañ-pa *r*gya-ras. Mal-ka-pa-chan died. 1210

Hguru Chhos *d*vañ, a *R*ñíñ-ma *g*ter-*s*ton was born. Khro-Locháva constructed a gigantic image of Maitreya, eighty cubits high, which he also consecrated. 1211

*R*gyalva, the eldest spiritual son of *H*brug-pa *R*go*d*-tshañ-pa, Yañ *d*gon-pa and *R*gyal-*m*tshan *d*pal were born.

The Kashmírian Paṇḍita S'akya S'rí returned to Kashmír. The monastery of *G*lañthañ Chhos-*s*de was founded. 1212

*G*shon-nu yon-tan of *Hod* jo-va died. *R*ñiñma Ñima *h*bum died.

The pupil of *H*jam-*g*ser called Chhos *S*ku-*hod* sser, who became the disciple of Semo-chhe the professor of *D*us *h*khor, was born. 1213

Khublai (emperor Se-chhen) Khán of Hor was born.

*S*Pal-te *D*gra-*b*chom died. 1214

Shva-*d*mar-tshul *d*pal, the disciple of Karma Bakshí, was born. *S*ñe-*m*do thams cha*d* *m*khyen-pa, the eldest son of *S*marseṅge, was born. Chhag *d*gra-*b*chom died.

Grag*s* *r*gyan of Sa-*s*ky died. 1215

*R*dorje tshul-khrims became the heirarch of *H*bri-goṅ. *S*kyob-pa *H*jig-*r*ten *m*gon-po died.

Khro-phu kun-*l*dan-ra*s*-pa died. Yaṅ-*d*ven-pa died. *R*gyal-va *R*ten na*s*-pa died. 1216

Rin-chhen *r*dorje his younger brother, who was the 12th (in succession), was born.

*D*ge-*b*śe*s* *l*chaṅ riba died. *S*gampo *h*dul *h*dsin-pa died. 1217

Glaṅ *s*ton śe*s*rab Seṅ became abbot of *R*gya*l*-*g*dan sa.

*R*ñog *r*dorseṅ died. 1218

*R*dorje tshul Khrim*s* of *H*bri-goṅ died. 1220

*D*von S'e*s*rab byuṅ became hierarch of *H*bri-goṅ'. Buddhism was first introduced in Hor (Mongolia). Chhiṅ-gis annexed Sar-tha-gva-chhen. 1221

*R*dorje ye*s*e*s* (Chho*s* go-ba of *H*bri-guṅ) was born. *H*khru*l* Shig Darma seṅge, the disciple of Rog-*m*chha*d* *g*sun, was born. 1122

*D*von *d*kar commenced building the grand hall of worship at *S*tag luṅ.

*G*ñ*os* Lha naṅ-va died. 1223

*B*de-leg*s* *r*gya*l*-*m*tshan of Neraṅ, who became the pupil of O*r*gyan Rinchhen *d*pal, was born. Shaṅ *s*ton *h*tshem-pa became abbot of *R*gya*l*-va *g*dansa.

The monastery of *D*ge-*h*dun *s*gaṅ was founded by the two disciples of S'akya S'rí Paṇḍita named Byaṅ and *R*dor. They also founded the monastery of *S*ñemo tshag-mig.

S'ákya seṅge founded the monastery of Ñamriṅ in Byaṅ (north) after which he died. S'ákya S'rí died in Kashmír. 1224

Rin Seṅ of Thog-kha of *H*brigoṅ was born. The fourteenth Kulika ascended the throne of S'ambhala. Chhiṅgis subjugated Miṅag in Tibet, after which he died. 1225

Ogoti, the son of Chhiṅgis, who was born in the year *fire-sheep*, assumed the sceptre of the Mongol-China kingdom. 1226

*S*gampo *S*ñepa jo sra*s* was born. San*s* *r*gya*s* *s*gom-pa died. 1227

Orgyan Seṅge rinchhen *d*pal, the pupil of *R*god tshaṅ-pa of *S*tod *H*brug, was born.

*R*ta-*s*ton jo-ye, the *R*ñiṅ-ma Lama, died. 1228

*B*kraśis *b*lama of *S*tag luṅ was born. Jo-*h*bed, the *R*ñiṅma Lama, died. 1229

Rin-seṅ of Kham luṅ in Bya-yul was born Sans *r*gya jo-*v*o *d*vaṅ phyug *g*shon-nu of Bya-yul was born. Gromo-chhe of *SN*ar thaṅ died. Lha-luṅ *d*vaṅ phyug died. 1230

Chhos *s*mon lam of *G*yam-*b*ssaṅ died. Rog S'esrab *b*lama was born.

Ogoti died. Guru Chhos *d*vaṅ recovered concealed religious books from the rock of *G*nam-*s*kas brag. 1231

S'aṅs *s*ton tshul *m*gon of the S'ans-pa school was born. S'er-*h*byuṅ died at *H*brigoṅ. Gotan, who was born in the *fire-tiger* year, ascended the throne of Hor. *R*ṅog kun-*r*dor and *R*togs *l*dan *b*ssaṅ died. 1232

Phags-pa, the son of Sa-*s*kya Ssans-tsha, was born. Seṅge-*s*gra, the son of *R*ṅog *r*gyal-*dg*a*h*, was born. 1233

*D*von *d*kar *s*kuya*l*ma of *S*tag luṅ died. *S*gam-po *S*ñi *s*gom-chhen died. 1234

Dar Seṅ, the disciple of *R*gya ras of *G*tsaṅ, died at *H*brug ra luṅ. *G*shon-saṅ succeeded him. 1235

Rin-*r*gyan and Ye-*h*byuṅ, the sons of Ssaṅs tsha of *S*a-*s*kya, were born. 1236

Phyagna *r*dorje, the younger brother of *H*phags-pa of Sa-*s*kya, was born.

Ssaṅs tsha *B*so*d* *r*gyan of Sa*s*kya died. 1237

Grags-pa yeśe's of Phag-gru was born. Grag*s* *b*so*d* (*H*tsham *b*cha*d*-pa) of *H*bri guṅ was born. The Mongol chief Chhigya dorta, with his troops overrun *D*vu (U) and *G*tsaṅ, and killed So-*s*ton and five hundred monks of Sa-*s*kya, after which he burnt Rva-*s*greṅ and *R*gya*l*-khaṅ monasteries. 1238

Chhos kyi *b*lama died at *S*narthaṅ. *D*von-S'er-*h*byuṅ died. 1239

Rin *b*ssaṅ, the younger brother of *R*ṅog Seṅ ge *s*gra, was born. Meloṅ *R*dorje, the pupil of *R*ñiṅma jo *h*ba*d* and disciple of Seṅ-ge *r*gyab-pa, was born. Jonaṅ kun-*s*paṅ Thug*s* *b*rtson-*h*gru*s* *r*je, the pupil of Chhos *s*ku *h*o*d* sser, was born. 1241

*H*phags-pa and Phyagna, the two nephews of Sa-*s*kya Paṇḍita, proceeded to Mongolia. Rog-śer ho*d* died. *H*bom *d*gon-pa of *S*tag luṅ died. 1242

Rog-shigpo Rin-chhen S'esrab died. 1243

Chho*s* kyi *r*dorje, the younger brother of *R*ñog Riu-chhen *b*ssañ-po, was born.

Sa-*s*kya Paṇḍita arrived at Lan-ju (Lan-chau). 1244

Sa-*ś*kya Paṇḍita interviewed the Mongol king Gotan. *S*ñe-*m*do *s*mar señ died. 1245

Sa-*s*kya Paṇḍita's saintly powers were tested. Having found him to be a sage and saint, the king imbibed faith in him. 1246

King Gotan sent a proclamation to Tibet making a present of the provinces of U and Tsañ to the Sa-*s*kya hierarch. Gya-pa gañ*s*-pa, the disciple of Dus-*m*khyen, died. *S*bom-grag*s*-pa died. 1247

Grag*s* rin *g*ñis *m*chho*d*-pa of Phag-gru was born. Se-*S*pyil Kha-va ye*ś*e*s* of Lhobrag was born.

Shañ *d*kon *d*pal was born. Lo-cháva Ra*s* died at the capital of the *H*brug-pa hierarchy. San*s*-*S*gom of *S*ñas thañ died. 1248

San*s* *r*gya*s* *d*von grag*s* *d*pal of *S*tag luñ was born. *S*'es-rab Señ-ge of Roñ, the spiritual son of *R*gva Lo-cháva, was born. Ñima señge of middle *H*brug was born. 1249

*M*Chhim nam grag*s* became abbot of *S*narthañ. Sa-*s*kya Paṇḍiṭa died at *S*prul-*s*de in Mongolia. King Gotan died. 1249

Muñ-khe, who was born in the year *fire-hare*, ascended the throne of Mongol-China. The Mongolian army suppressed Mon *m*khar *m*gonpo *g*doñ in Tibet. 1250

*H*Phag*s*-pa of Sa-*s*kya became prince Khublai's spiritual guide. The Sa*s*kya-pa hierarch took possession of the thirteen provinces of Tibet, called Khri-*s*kor *b*chu-*g*sum. 1251

The Mongolian king went at the head of an army to Gara *l*jañ yul and returned to his capital in the following year. 1252

Grag*s* señ of Mun-mebrag kha-wa, the pupil of Jonañ kun *s*pañ, was born. 1253

*S*pyan *s*na grag*s* *h*byuñ died. 1254

Bakshi became the spiritual guide of the Mongol king Muñ-khe. Ssem grag*s* señ of Bya-yul died. Guru Chho*s* *d*vañ unearthed the six *R*ñiñ ma scriptures. 1255

San*s*-*r*gya*s* *d*pal *b*ssañ (*S*tag luñ *d*von-po) was born. Phorog *m*do-*s*de died. 1256

Señge rinchhen of *S*pa*h*i-*s*kya and of the middle *H*brug-pa school was born.

Kun *d*ga*h* *b*ssañ-po of *S*ñe-*m*do, an incarnation of *R*go*d*-tshañ*s*-pa, was born.

*R*gya*l*-va yañ *d*gonpa, the son of Tham*s* cha*s* *m*khyenpa, died. *R*go*d* tshañ *m*gon *r*dor of *S*to*d* *H*brug died. 1257

*B*de-leg*s* *r*gya*l* *m*tshan founded the monastery of Ssañ ssañ nerañ. Lha *h*gro *m*gon *d*vañ phyug died.

Muñ-khe, the Mongol king, died. 1258

Yon *r*gyam, the pupil of Jonañ kun *s*pañ, was born. Karma *B*sam-*g*liñ Rinchhen died. 1259

*R*gya*l* *m*tshan *h*bum of *H*jag, who became a leader of the Sañspa school, was born.

Karma Bakshí, during the years *fire-serpent*, *iron-monkey* and *iron-bird*, made miraculous religious demonstrations. *B*so*d* *r*gyan of Go-brag died. 1260

*B*dag-chhen *b*ssañpo *d*pal, the son of Sa-*s*kya Ye-*h*byuñ, was born.

Śakya *b*ssañpo, well-known by his other name *S*tag luñ Lo-cháva, was born. 1261

Ssur-phu-va, the pupil of *S*pyan-*s*na rin *l*dan, was born.

The great shrine of *M*tshur-phu was built by Bakshí Ñe *l*dan *s*gom. 1262

Sans *r*gya*s* *s*ton tshul Khrim*s* Señge of Bya-yul was born. 1263

Chhag chho*s* *r*je *d*pal died.

*H* Phag*s*-pa of Sa-*s*kya returned to Tibet from Mongolia. 1264

Kumára, the son of Meloñ *r*dorje (of the *R*ñiñma school), was born.

*G*shon-señ died at *H*brug-Raluñ. 1265

## CYCLE V.

Thog *r*dug-pa died at Phag-gru. Phyagna of Sa-*s*kya died. 1266

Dharmapála Rakshita, son of Phyagna of Sa-*s*kya, was born. 1267

*H*phag*s*-pa again returned to Hor (Mongolia). 1268

Emperor Sa-chhen (Khublai), the grand son of Chhiñ-gis was engaged in building Peking and three other cities, from the year *wood-mouse* up to this year.

Kharag grag*s* *r*gya*l* of *H*brug died. 1269

*G*shon-nu *S*mon lam of Bya-yul and *S*pyi-ther pa*h*i *D*vonpor Grag*s*-pa of Dvagpo were born. 1270

Sans *r*gya*s* yar-byon of *S*tag luñ died. 1271

Guru chho*s* *d*vañ died. 1272

The monastery of Tharpa*g*liñ was founded in the confines of Nepal and Tibet.

Ye-*h*byuñ of Sa-*s*kya died in *L*jañ-yul. 1273

S'akya *b*ssañ-po of Sa-*s*kya became the viceroy of the thirteen provinces of Tibet, called Khri-*s*kor *b*chu *g*sum. 1274

*H*jam-*d*vyañs don-*r*gyan of Sa-*s*kya and *D*vañ-bo *br*tan *B*lama of *B*sos *r*gyan were born.

San*s* *r*gya*s* *d*von grag*s* *d*pal of *S*tag-luñ founded the monastery of Byam*s* rinpo-chhe. 1275

Ssur-khañ-pa *d*vañ ye of Se-*s*pyil was born. Grag*s*-pa *b*so*d* *d*pal of the *B*ka*h*-*br*gyu*d* school was born. *S*ñe-*m*do Tham*s* cha*d* *m*khyen-pa died. 1276

*R*dorje rinchen of *H*brigon was born. 1277

Ye*ś*e*s* *b*lama of *S*tag luñ was born. *S*gampo chho*s* *br*gyan was born.

Rinchhen *r*gya*l* *m*tshan of Sa-*s*kya died. *B*chuñ Tilli died at *H*brigcñ. 1278

Rinchhen Chho*s* *r*gya*l* of the Shi-bye*d* school, who was the grandson of *H*phru*l* shig-dar señ, was born. *H*phag*s*-pa of Sa-*s*kya died. The twelveth *G*chuñ died.

San*s**r*gya*s* Ra*s*-pa of the Shi-bye*d* school died. 1279

Dharmapála became hierarch of Sa-*s*kya. Bya-rog *R*dsoñ (jong) was captured. *R*ñog Gssi-brji*d* Grag*s* died. 1280

Bya-yul Kham*s* luñ-pa died. *R*ga-Lo-cháva of Miñagag died. *B*kra-grag*s*, the red-cap Lama, died. 1281

Chho*s* *r*gyan, the son of latter *R*ñag Chho*s* *r*dor, was born.

Shva *d*mar Grag*r* señ, the first incarnation of *B*kra-grags the red-cap Lama, was born.

*R*dor *r*gyan of Roñ, the first disciple of S'er señ, was born.

Karma Bakshí died. 1282

San*s* *r*gya*s* *S*gompa of Bya-yul and Tshul khim*s* S'e*s*rab were born.

The third Karma-pa hierarch Rañ byuñ *r*dorje, an incarnation of Karma Bakshí, was born.

*R*dor-*r*gya*l*, the 28th hierarch of *H*brigoñ, was born. *R*ñog *r*gya*l* po *d*ga*h* died. 1283

Lha-*b*lo ho*d* of Se-spyi*l* was born. The *H*brigoñ-pa authorities burnt Bya-yul.

Sañs *r*gya*s* *G*chuñ S'ton died, and the abbotship remained vacant for five years.

Thog kha-va died at *H*brigoñ. 1284

Lha brag kha-va died. 1285

*G*yuñ-ston *R*dor *d*pal, the pupil of Ssur-bya*m*s señge (the *R*ñiñ-ma Lama), who was Karma Rañ byuñ's spiritual guide, was born.

Dharmapála died at Sa-*s*kya, and S'ara-va *H*jam *d*vyaṅs succeeded him in the hierarchy. Ñe-seṅ of *H*brug Raluṅ died.

Ratna guru of *S*tag luṅ was born. *H*tsham bcha*d*pa died at *H*brigoṅ. Phag-gru Grag*s*-ye died. 1287

Seṅge *r*gya*l*-po of middle *H*brug was born. *M*chhim nam*s* grag*s* of *S*narthaṅ died. 1288

Bu-*s*ton Rin-chhen grub was born. *R*ñiṅma Lama Leg*s*-*l*dan was born.

The Sa-*s*kya-pa authorities sacked *H*brigoṅ. 1289

Tshu*l*-*m*gon of Bya-yul was born. 1290

*G*ser-*g*liṅ *b*kra *ś*is *d*pal, a follower of S'an*s*-pa, was born.

Do*l* bu S'er-*r*gyan, a disciple of Jonaṅ yon-*r*gyan, was born.

Kun-*m*khyen chho*s* *s*ku *Hod*sser died. 1291

Grag*s* *r*gya*l* of Phag-gru, who had acquired the fourfold *R*ñiṅma perfections, was born.

Urgyan *m*gonpo śer *d*pal of *S*tag luṅ died. 1292

*M*khan-chhen Jñána Prajñá was born. Sa-chhen's (Khublai's) grandson Olcha*h*ithu, who was born in the year *wood-ox*, became the emperor of Mongol China. 1293

*R*gya*l*-sra*s* Thogme*d* *b*ssaṅ po *d*pal was born. The *R*ñiṅma Lama *G*yuṅ-*s*ton Ssla-va *H*jam *d*vyaṅ*s* *b*sam-*h*grub *r*dor je was born. 1294

*M*chhuim karma *k*loṅ-chhen-pa was born. *S*gam-po *S*ñi-va Jo-sra*s* died.

San*s* *r*gya*s* *d*pon-grag*s* of *S*tag-luṅ died. Emperor Khublai died. 1295

*B*kra*ś*i*s* *b*lama died at *S*tag-luṅ. 1296

Karma *R*ñiṅ Lama *G*yuṅ-*s*ton visited Hor. 1297

Tiśri Kun-*b*lo, son of *D*pal *b*ssaṅ of Sa-*s*kya, was born.

*G*yag-*s*de Panchhen (B*r*tson-*h*gru*s* Dar *r*gya*s*), the pupil of Shva-*d*mar Grag*s*-seṅ, was born. 1298

Ratnákara of *S*tag-luṅ was born. 1299

Ti*h*i situ Byaṅ *r*gyan of the Phag-gru dynasty was born. 1301

*D*vaṅ lo-cháva Byaṅ-chhub *r*tsemo, also called *B*lo-brtan *d*pon-po, was born.

The monastery of Lha-*s*teṅ was founded by Raṅ-byuṅ *r*dorje.

*H*khrul shig Darseṅ of the Shi-byed school died. The *R*ñiṅ-ma Lama Meloṅ *r*dorje died. 1302

The venerable nun Leg*s* *b*lo *r*gyan, a disciple of *B*ssaṅ *d*pal of Sa-*s*kya, was born. 1304

Jonaṅ Phyog*s* la*s* *r*nam *r*gyal, a native of *M*na*h* ris, who was the pupil of Dol-bu śer *r*gyan, was born. 1305

Emperor Olcha*h*ithu of Hor died. 1306

*K*loñ Čhhenpa, the disciple of Kumára (the *R*ñiñ-ma Lama), was born. Another grandson of the emperor Sa-chhen, named Khulug who was born in the year *iron-serpent*, became emperor. 1307

The Sage *S*'añ*s* *s*ton Tshul *m*gon died. 1308

The saint Orgyan pa señge died.

Tisri kun *r*gyan, the son of *B*ssañ *d*pal of Sa-*s*kya, and *H*jam-*d*vyañ*s* don *r*gyan were born.

*R*gyal-*m*tshan *D*pal *b*ssañ of *S*'añ*s* *h*ba*h*-ra, who became the disciple of Ssur-phuva, was born. *G*sar-ma Grag*s*-śes, the twelveth Phag gru hierarch, was born. Hjag-chhen Byam*s* *d*pal of the *S*'añ*s*pa school was born.

*G*ñis-*m*chho*d* died at Phag-gru. *D*pal-*b*ssañ of *S*tag-luñ died. 1309

*G*shon nu *r*gyal-*m*tshan of Ri-pa, the disciple of Ssur-phuva, was born. *R*ñog chho*s* *r*dor phyi ma died.

Emperor Khulug died. *B*lama Dampa *b*so*d* nam*s* *r*gyal *m*tshan, the son of *B*ssañ *d*pal of Sa-*s*kya, was born. Sañs *r*gyas jovo of Bya-yul died. 1310

In Hor, Pauyanthu (born in the year *wood-bird*), the youngest brother of the emperor Khulug, ascended the throne. Ye*s*es Lama of *S*tag-luñ died in India. 1311

San*s*-*r*gya*s* Rin-chen died at *H*brug Raluñ. Jonañ Kun spañ died. The metaphysical theory of "Luñ thig" was inculcated by Tshul *r*dor, an incarnate *R*ñiñ-ma Lama. 1312

The sage *H*jam *d*pal ye*s*es was born. *H*jam *d*vañ*s* Kun dga*h* señge of middle *H*brug was born. 1313

After the death of *R*dorje Rinchhen, *R*dorje *r*gya*l*-po became abbot of *H*brigoñ and built the grand shrine of *H*brigoñ. *S*'e*s*rab Señge of Roñ died. 1314

Kun-*d*gah *b*ssañ-po of *S*ñe-*m*do died. 1315

*D*kon-mchhog *d*pal of Shañ died. 1316

The (astrological and astronomical) work, called *R*tsi Kun *b*sdu*s*, was composed by Rañ-byuñ-pa. 1317

*S*gampo Sañs-*r*gga*s* Chho*s* Señ was born. The sage *G*shon-nu Grub, the disciple of Sañs-*r*gga*s* *s*ton of *S*'añ*s*, died. *R*ñog Rin-*b*ssañ died. 1318

Orgyan *m*gon-po of *S*tag-luñ erected a large shrine and furnished it with images and religious books. Emperor Pauyan-thu died. 1319

Gegen khan, the son of Pau-yanthu, who was born in the year *water-hare*, ascended the throne. 1320

*B*lo gros *R*nam dag was born in Bya-yul. Bu-ston wrote the historical work called Chhos *h*hyuñ rin mdso*d*. *B*ssañ *d*pal of Sa-*s*kya died. Emperor Gegen Khan died in Hor. 1321

Ye-sun-the-mur, the great-grandson of Sa-chhen (Khublai), who was born in the year *water-serpent*, became emperor. 1323

*R*dorgyan of Roñ died. Sañs-*r*gya*s*-ston of Bya-Yul died. Señ-*r*gya*l* died at *H*brug Raluñ. 1324

Nam *m*kha*h* *r*gya*l*-*m*tshhn of Lho-brag, who was Tsoñ-khapa's tutor, was born. 1325

*M*tha*h*-ya*s* (Ananta), the fifteenth Kulika, ascended the throne of S'ambhala. Kun-*b*lo of Sa-*s*kya died. Yon-*r*gyam, the Jonañ Lama, died. 1326

Emperor Ye-sun-the-mur died. 1327

The two sons of the emperor Khulug, namely Rinchhen *H*phag*s* (born in the year *iron-mouse*) and Kaus'alí (born in the year *water-tiger*), successively became emperors, and each died after a few months' reign. Pau-yanthu's son Chi-yá-thu (born in the year *wood-dragon*) became emperor. 1328

The abbot Ye*ś*e*s* *b*so*d* nam *r*gya-*m*tsho was born. 1329

Don-grub *d*pal, the son of Señge-*h*bum, the spiritual son of *R*ñog Chhos *r*dor, was born.

Rañ-*h*byuñ *R*dorje visited Hor. 1330

Ta-*d*ven *b*lo-*r*gyan and Ta-*d*ven Chhos *r*gyan, the sons of Tisri Kun-*r*gyan of Sa*s*kya, were born. Emperor Chi-yá-thu died. Ratna S'rí, the son of Kausalí, born in the year *fire-tiger*, became emperor. After one month's reign he died. 1331

Nam-*m*kha*h* *d*pal of *S*tag-luñ was born. The monastery of *G*na*s* nañ was founded by *M*tshur. Tho-gwan themur the son of Chi-yá-thu, born in the year *earth-horse*, became emperor. 1332

*R*gyan *h*bum of S'añ*s* jag was born. 1333

*H*bri goñ Chhos *r*gya*l*, who became Tsoñkhapa's tutor, was born. Se-spyi*l*-pa Rinchhen Señ was born. 1334

*S*gampo Chhos *r*gyan died. 1335

Se-spyi*l* Lha of Ssur-khañ died. 1336

Sans-*r*gya*s* *S*gom Phyi-ma died in Bya-yul. 1337

Ratna Guru of *S*tag-luñ died. Karma Rañ byuñ *r*dorje died in Hor. 1338

The fourth Karma hierarch Ro*l*pa*h*i *r*dorje Dharma Kírti was born in Koñ-po. 1339

*B*so*d* nam *b*ssañ of *S*myuñ-*g*na*s* was born. 1340

*B*so*d* nam*s* *r*gya*l*-*m*tshan (Kun-spañ chhenpo) was born. Se-spyi*l*-pa S'akya *b*so*d* was born.

On the death of Nam legs-pa, *B*lama Dampa became the Saskya hierarch. Gshon-smon of Drag-po died. Kumára, the *R*ñiñ-ma Lama, died. *D*pal-blo-brtan died. 1341

Mun-Me brag Kha-va, the J'onaṅ abbot, died. 1342

According to the chronology of *R*gya-*S*ton the Sútránta vyákaraṇa was introduced. 1343

S'akya bssaṅ the Lo-cháva of *S*tag-luṅ died. 1344

*B*lo gros Seṅge of the middle *H*brug-Raluṅ school was born. 1345

Lho-rin-pochhe Grags you of the *B*ka*h*rgyud school was born. Kun Seṅ died at *H*brug-Raluṅ. 1346

*R*je-btsun raṅ *h*da*h*-pa *G*shon was born. Theg-chhen chhos *r*gyal kun bkra, the son of Chhos *r*gyan of Sa-skya, was born. Ta*h*i Situ Byaṅ-chhub *R*gyan became the ruler of the entire *D*vus (or central Tibet). Shva-*d*mar Grags seṅ died. The Shi-bye*d*-pa abbot Rinchhen Chhos *r*gyal died. 1348

Rin *r*gyan Dus *h*kor-va, the pupil of *H*j'am-*d*vyaṅs Chhos *m*gon Dolbus, was born. *G*yag-phrug Sans was born.

*M*kha-spyo*d* dvaṅ-po Ye-*d*pal, the second red-cap hierarch, an incarnation of Grags-seṅ, was born. Sans *r*gyas rin-*r*gyan, the disciple of *H*jam-*d*vyaṅs bssam grub the *R*ñin-ma abbot, was born. Se-spyil-pa Lha blo *h*od died. 1349

Chhos *h*byuṅ rin-chhen, the disciple of *H*jag-chhen Byams-*d*pal, was born. The town of *R*tse-thaṅ (also called *R*tsis-thaṅ) was founded by Ta*h*i Situ. *R*dor-*r*gyal died at *H*bri-goṅ. 1350

*B*so*d* nams lhun-grub of Se-spyi*l* was born. The sage Jñána-prajña died. 1351

Karma Ro*l* pa*h*i *r*dorje entered monkhood. A great earthquake took place in Tibet. 1352

S'ar-rin-pochhe (of the *B*ka*h* *r*gyu*d* school) of Khams was born.

Byaṅ-pa Ta*h*i *d*ven, with the permission of S'er-*r*gyan, repaired the monastry of Ñam riṅ. Ta*h*i Situ brought the whole of *G*tsaṅ under his power. 1353

*B*logros Seṅ ge of *R*gya*l*-lha khaṅ and others commenced the *M*ñon-pa (Abhidharma.) 1354

*H*jam *d*pal *r*gya-*m*tsho, the adept, was born. Chhos *b*shi *g*sarma Grags byaṅ of Phag-gru, who became Tsoṅkhapa's spiritual guide, was born. 1355

Tsoṅ-khapa was born at Tsoṅ-kha. His disciple S'akya *b*so*d* was born. *S*pyan *s*ña-va *B*so*d* nams Grags was born. Grub-pa S'esrab of *S*nar-thaṅ was born. Karma Rol-pa*h*i *r*dorje received the final vows of monkhood. 1356

Ta*h*i S'rí Kun-*r*gyan of Sa-*s*kya died. 1357

*B*sod nam Grag*s* of Phag-gru was born. *B*kra-śi*s d*pal *b*r tseg*s* of *S*tag-luṅ was born. Gyag-*s*de pan chhen founded the monastery of E-bam. *R*ñog chho*s r*gyan died. 1358

Blo-gro*s b*ssaṅ-po of *G*tsaṅ, the pupil of *H*ba*h*ri, was born. Byaṅ *d*pal, the son of *R*ñog don-*dpal*, was born. Chho*s b*shi *R*ñiṅ ma died at Phag-gru. 1359

Ratnákara, the abbot of *S*tag luṅ, died.

Jonaṅ Lo-cháva S'er-*r*gyan died. 1360

Rimi *h*bab-pa was born. *R*je Tsoṅkhapa received abhiśeka from Don-rin-pochhe. 1361

*Rgod* phrug ra*s*-pa Grag*s h*byuṅ of the *B*ka*h br*gyu*d* school, a native of Ninu, was born. *R*je-*b*lama (Tsoṅkhapa) became a (S'ramaṇera) neophite monk under Don rinpa. Tshu*l m*gon of Bya-yul died. *R*ñiṅma *K*loṅ-chhen died. 1362

Darma Rinchhen (Khri-chhen *r*gya*l*-tshab) was born. Ye*ś*e*s* rinchhen of middle *H*brug was born. Bu-*s*ton Tham*s* cha*s m*khyen-pa retired to the mansion of purity (died). 1363

*G*ser-*g*liṅ-pa *b*kra-*d*pal of S'aṅ*s* died. 1364

Byaṅ-Sem*s* kun *b*ssaṅ, a pupil of *R*je (Tsoṅ-khapa), was born. Orgyan *m*gon-po of *S*tag luṅ died. *B*sam-*g*tan *dpal* of the *B*kah-*r*gyu*d* school died. 1365

*S*ton S'akya *r*gyan of Kham*s r*gya*l*-mo roṅ was born. The monastery of Roṅ-Byam*s* chhen was founded by Sem*s*-*dpah gs*hon *r*gya*l*. 1366

The Mongol emperor Tho kwan themur, having lost the throne, fled to Mongolia which he ruled over. Huṅ-Wu, the founder of the Tamiṅ dynasty, became emperor of China. *G*yuṅ *s*lon, the predecessor of Mkha*s* grub, died. 1367

The great Tai Miṅ invited the sage (sthávira) Chhu-*hgr*am-pa to China.

*R*gya*l* sra*s* thog me*d* was born. 1368

The twelveth *G*sarma died. 1369

*S*gom-po chho*s d*vaṅ phyug was born. S'er-seṅ of middle *H*brug was born. 1370

*R*je-*b*lama (Tson-khapa) proceeded to *D*vu*s* and *G*tsaṅ (Tibet proper). 1371

Hor *s*ton nam *m*khah *d*pal, the abbot of the Byaṅ-*r*tse division of *D*gah*l*dan, was born.

*R*je-*b*lama (Tsoṅ-khapa) visited *H*bri-gon and *B*de-va chan. 1372

The Vinaya teacher Grag*s*-pa *r*gya*l*-*m*tshan was born. 1373

Sha-lu Leg*s r*gyan (Khri-chhen) was born. Bo-doṅ chho*s*

*r*gyan Phyog*s* las *r*nam *r*gyal was born. *B*lo grag*s* died at *S*nar-thaṅ. *B*lama Dampa *b*so*d* *r*gyan was born. 1374

*R*je-*b*lama collected the first series of his religious discourses. *H*jam *b*sam *r*dorje, the *R*ñiṅ-ma Lama, died. 1375

Grag*s* don-pa of *S*narthaṅ was born. 1376

The monastery of *S*tag-*r*tse *r*nam *r*gya*l* *s*gaṅ was founded by *M*kha*h* *s*pyod *d*vaṅ-po (a red-cap Lama). Gyag-*s*de Panchhen died. 1377

*H*jam-*d*vyaṅ*s* chho*s* *r*je *b*kra*ś*i*s* *d*pa*l* *l*dan was born. *S*tag luṅ Nam *d*pa*l* died. 1378

*S*pyan *s*ṅa *b*so*d* *b*ssaṅ of Phag-gru was born. *M*khan-po Ye*ś*es *b*so*d* *r*gyam died. *D*vaṅ Lo-cháva Byaṅ-*r*tse died. 1379

*D*pa*l* *l*dan Don grub, also called *S*tag-phru-gu S'rí, a disciple of *R*je (Tsoṅ-khapa), was born. Chog-ro Ñor-pa Kun-*b*ssaṅ of Sa-*s*kya was born. Kun-*r*gyan of Sa-*s*kya *r*dsoṅ was born. 1381

Byam*s* chhen-cho*s* *r*je of S'era was born. *S*pyan *s*na *d*pa*l* *b*ssaṅ of Phag-gru was born. Guṅ Ru *r*gyan *b*ssaṅ of Sera was born.

Karma Ro*l* *r*dorje died. 1382

The Indian Pandit Pan-chhen Nag*s* Rin was born. De-*b*shin *g*s'eg*s*-pa, the fifth Karma hierarch, was born. S'akya *r*gya*l*-po, the *R*ñiṅma Lama, who was the abbot of Yaṅ *r*tse-ra, was born. 1383

The red congregation hall of *S*tag luṅ was erected by *D*pal *r*tsegs.

*D*ge legs *d*pa*l* *b*ssaṅ (Khri-chhen *m*kha*s* grub-thams cha*d* *m*khyenpa) was born. (He was the first of the line of Panchhen Rinpo-chhes of Taśi-lhunpo). Thaṅ-*s*toṅ *r*gyal-po, the physician, was born. 1384

Ku-jo *r*tog*s* *l*dan was born. Karma *S*mra*s* seṅ *r*tog *l*dan was born. *B*so*d* *r*gyan, the twenty-second Phag-gru hierarch, was born.

The shrine of Mamo in *D*ga*h* *l*dan was founded by *M*kha*h* *s*pyod-pa. The *B*shipa *g*sar-ma of Phag-gru died. Jonaṅ Phyog*s* legs *r*nam *r*gya*l* died. 1385

## CYCLE VII.

The monastery of Se-pyi*l* was governed by the earlier S'akya *b*so*d* nam*s*. 1386

Mu*s*-chhen kun *m*chhog *r*gyan, the disciple of Dorpa Kun *b*ssaṅ, was born. 1387

Khri *B*log*r*o*s* chho*s* *s*kyoṅ was born. 1388

*M*khan chhen *H*jam-ye died. *B*lo seṅ died at *H*brug Raluṅ. Ripa *g*shon-nu *r*gyal *m*tshan died. 1389

*D*ge-*h*dun grub, the first of the line of the (*R*gyal-va Rinpo-chhe) Talai Lamas, was born. *B*so*d* nam *r*gyal-*m*tshan of Se-spyil-bu was born.

Hjag-chhen Byam*s* *d*pal of S'aṅ died. S'aṅ *H*ba*h*-ra, the pupil of Ssur-phu and disciple of *S*pyan-*s*ña Rin *l*dan, died. 1390

Byaṅ-sem*s* *b*lo *r*gyan, the disciple of *R*je *b*lama (Tsoṅ-khapa), was born. *H*gos Lo-cháva (yi*d* *b*ssaṅ *r*tse *g*shon-nu *d*pal), the Karma-*R*ñiṅ abbot, was born. *R*je *b*lama, after being miraculously visited by *H*jam-*d*vyaṅs, proceeded to Bya-bral in *Hol*kha. S'er seṅ died at *H*brug Raluṅ. 1391

*R*dsiṅ-phyi was repaired by *R*je-*b*lama Tsoṅ-khapa chenpo. He was miraculously visited by *H*jig*s*-bye*d* at *R*gya sog phu. *G*shon-nu ye*ś*e*s* died in Bya-yu*l*. 1392

Byaṅ-sem*s* śer *b*ssaṅ of *S*ma*d* was born. *R*je *b*lama (Tsoṅ-khapa) met Lho-brag-pa. 1394

*R*je *b*lama founded the educational college of *G*ña*l*. 1395

Rin-seṅ of Se-*s*pyil-bu died. 1396

Nam-*m*kha*h* *d*pal of middle of *H*brug was born. 1397

*B*so*d* nam*s* *m*chhog grub of *S*narthaṅ, who became *M*kha-grub's disciple, and *M*khan-chhen grub śer's nephew were born.

The second Miṅ emperor Huṅ-wu tsha ascended the throne of China. 1398

Grag*s*-pa *d*pal *l*dan of *S*pa*s* and *H*dul-*h*dsin *B*lo-grà*s*, the disciple of *D*ge-hdun grub, were born. 1399

*B*sso*d*-pa *d*pal grub of *S*narthaṅ was born. *B*so*d* nam*s* *r*nam *r*gyal of Byam*s* *g*liṅ, who taught asceticism to *R*je *b*lama Tsoṅ-khapa, was born. Lama kun died at the monastery of *S*narthaṅ. Nam-*m*kha*h* *r*gyal *m*tshan of Lho-brag died. 1400

Baso chho*s* kyi *r*gya*l* *m*tshan, the younger brother of *M*khas grub *r*je, was born. Khri *B*lo gro*s* *b*rtan-pa was born. *S*pyan *s*ña *b*lo-gro*s* *r*gyal *m*tshan was born. *D*pa*l* *l*dan *b*ssaṅ-po of *H*dul nag was born. San*s* *r*gya*s* chho*s* kyi seṅ-ge of *S*gampo died. 1401

Byaṅ-chhub *r*gya-*m*tsho of *S*tag-luṅ, the red-cap Lama, was born. Ratna *g*liṅ pa of the *R*ñiṅ-ma school was born. Yunglo became emperor of China. 1402

Chho*s* *d*vaṅ grag*s*-pa of Shaṅ Shûṅ was born. 1403

S'er-ab*s* Rin chhen, called *S*tag Lo-cháva, was born. *M*kha*s* grub *r*je took the final vows of monkhood. *D*ge-*h*dun grub entered monkhood. *M*khah *S*pyo*d* *d*vaṅ-po, the Shva-mar (red-cap) Lama, died. 1404

Chhos *dpal* yes'es, the third Shva *d*mar Lama and incarnation of *M*khah *dvaṅ*, was born. 1405

*M*khas grub Thams cha*d* *m*khyan-pa became a disciple of *R*je Tsoṅkhapa. The fifth Karma-pa Lama proceeded to China. *S*pyan *s*ña *dpal* *b*ssaṅ of Phag-gru died. 1406

*B*kra-*ś*is *dpal* *h*od of *S*tag-luṅ was born. Emperor Tai Ming (Yunglo) invited Byams chen chhos *r*je, abbot of Sera, to China. Grag*s* *b*sod nam*s* died at Phag-gru. Chhos *h*byuṅ Rinchhen, the saint, died. 1407

*Dpal* *b*ssaṅ of Se-*s*pyil-bu was born. Tsoṅkhapa founded the grand prayer meeting of Lhasa, called Monlam chhenpo, and founded the great monastery of Rivo *Dgah* *l*dan *r*nampar *rgyal* va*h*i *gliṅ*. Kunsraṅ *b*sod *r*gyan died. 1408

Panchhen *b*ssaṅpo *b*kra *ś*is of *B*kra *ś*is lhun-po was born. *S*'akya *S*'rí of Tsaṅ was born. *D*ge-*h*dun grub took the final vows of monkhood. *S*'akya *b*sod nam*s* of Se-spyi*l*-bu died. 1409

Saṅs *r*gyas *h*phel, the Rab *h*byams-pa (doctor of divinity) of Byams chhen, was born. 1410

*R*je-*b*tsun Reṅ *h*dah-va died at Shiṅ shun. 1411

Ye-*ś*es rinchhen died at *H*brug-Raluṅ. 1412

Khri *S*mon *D*pal legs *b*lo was born. Gyag phrug saṅs *d*pal of Sa-*s*kya died. Lho Rin-po chhe grag*s* yon died. 1413

Khri Yes'es *b*ssaṅpo was born. Karma De-*b*shin *g*śegs-pa died. 1414

*M*thoṅ-va don-*l*dan, the sixth Karma hierarch, was born. *Hj*am *d*vyaṅs Chhos *r*je *d*pal founded the great monastery of *H*bras *s*puṅ. Da-puṅ *B*sod *b*ssaṅ of Phag-gru died. 1415

*D*ge *h*dun *b*ssaṅpo of *G*tsaṅ gi khyuṅ-po bya-bra*l*, the pupil of Baso, was born. The twenty-second hierarch of Phag-gru succeeded his predecessor. The historical work, called Chhos *h*byuṅ *b*stan-pa *G*sa*l* bye*d*, was written by Don grub *d*pal of Kam kam. *R*ñiṅ-ma Rin *gliṅ* recovered some concealed religious works from underneath the rock of Khyuṅ tshaṅ brag. 1416

Ñag *d*vaṅ grag*s* of Stag-luṅ was born. 1417

Kun *d*gah don-*h*grub, who founded *R*gyu*d* sto*d*, was born.

The monastery of Sera theg chhen *gliṅ* was founded by S'akya ye*ś*es. Dharma Rinchhen became Tsoṅkhapa's successor on the grand hierarchical throne of *Dgah* *l*dan. *R*je Tsoṅkhapa returned to the presence of Maitreya Bodhisattva. 1418

S'er *r*gyan of *S*narthaṅ was born. The monastery of *G*saṅ *s*ñag*s* *m*khar was founded. 1420

*R*je-nor *b*ssaṅ *r*gya-*m*tsho was born. *R*gyan-*B*de founded the monasteries of *G*nas thaṅ and Ssuṅ-man of Me-*r*tog *l*dan. 1421

*G*tsañ *b*lo-gro*s*, the pupil of *D*pa*h* ra, died. Grub S'erab*s* of *S*narthañ died.

Chho*s* *d*vañ-phyug of *S*gampo died. 1422

Grag*s* śer (the second) of *S*narthañ was born.

Lo-cháva *B*so*d* nam*s* *r*gyam was born. He wrote thirteen volumes. *B*kra śi*s* *d*pa*l* *r*tsegs died at *S*tag luñ. 1423

*M*khan-chhen Du*s* *H*khor-va Rin *r*gyan was born. Karma *M*tshur-phu-pa composed Bye*d* *r*tsi*s* and Sa-byar *S*grub *r*tsi*s* and *G*ssa*h* *g*na*s* drug.

Huñshi, the fourth Ming emperor, ascended the throne of China. Nam *d*pa*l* of *H*brug Raluñ died. 1424

Panchhen nag*s* kyi Rinchhen first visited Tibet. *B*sson-te became the fifth Ming emperor of China. 1425

*D*pal-*h*byor lhun grub of Sera (a native of *G*ñal-*s*ton) was born. The sixteenth Kulika, named Bhúpála, ascended the throne of S'ambhala. *D*pa*l* *l*dan *b*lo-gro*s* of Sera was born. S'ar Rinpochhe died. 1426

S'akya *m*chhog *l*dan was born. *R*gyal *d*vañ chho*s* *r*je *d*pal of middle *H*brug was born. *R*togs *l*dan *H*jam *d*pa*l* *r*gya-*m*tsho died. 1427

*B*lo *b*ssañ grag*s*-pa of *H*dar-*s*ton was born.

*H*jam *d*vyañ*s* *D*ga*h* *b*lo (Leg*s*-pa chho*s* *h*byor) was born. S'er *b*ssañ of Byañ-*r*tse was born. *M*chhog lha of Rva *s*to*d* was born. Goram *b*so*d* señ was born. *R*togs *l*danpa's incarnation, *R*gya sra*s* śe*s* rab *h*phel, was born. *B*ssañ dor kun-*b*ssañ of Sa*s*kya founded the monastery of E-bam. Se-spyil *b*so*d* lhun died. 1428

*B*kra śi*s* *d*pal ho*d*-pa became abbot of Stagluñ. *B*so*d* *r*gyan of Se-spyil-bu died. 1429

*M*kha*s* grub *r*je became the grand hierarch of *D*ga*h* *l*dan. Sañ*s* *r*gya*s* rinchhen *r*gya*l* *m*tshan, the *R*ñiñ-ma Lama of Ye-*r*tse, died. 1430

Kun-*d*gah *r*nam *r*gyal of Thon-mi, the disciple of Panchhen Bya*m*s *g*liñ, was born. *H*bum phrag *g*sum-pa of Sa*s*kya and Kun-*d*ga*h* chho*s* *b*ssañ were born. 1431

Panchhen Ye-*r*tse of *B*kra*ś*i*s* lhunpo was born. Se-*s*pyil-pa *S*ñan grag*s* was born. The monastery of *R*gyu*d* *s*ma*d* was founded by *R*je-señ. *B*so*d* *b*ssañ of *S*myuñ *G*na*s* died. 1432

*M*kha*s* grub *r*je wrote a commentary of the Kálachakra system. *H*dul *h*dsin grag*s* *r*gyan died. 1433

The monastery of Nálendra was founded by Roñ-*s*ton.

The possession of *G*tsañ passed to Rin-*s*puñ from the hands of Phag-gru. 1434

The monastery of *S*tag mo *g*liñ was founded by Muschhen *D*kon *m*chhog *r*gyan. The sixth Ming emperor Tiñg-thûñ ascended the throne. Kun *r*gyan of Saskya Jong died. 1435

The monastery of Byam*s*-pa *g*liñ in Chha*b* *m*do in Kham*s* was founded by *S*ma*d* S'e*s* rab *b*ssañ, the disciple of Tsoñ-khapa. 1436

The monastery of *M*do *S*ñag*s* *g*liñ was founded by Byañ Sem*s* kun *d*gah. Mkha*s*grub Chho*s* *r*je died. 1437

*B*lo *b*ssañ Ñima, the *D*von-po (disciple) of Tsoñ-khapa, was born. The first *H*phag-pa-lha of Kham*s* was born. *R*je Ñag *d*vañ of Phag-gru was born. The great chhorten of *D*pal *h*khor chho*s*-*s*de of Gyañ-tse was built. 1438

Chho*s* skyoñ *b*ssañ-po (Shvalu Lo-cháva) was born. 1439

Byañ Sem*s* S'akya *b*so*d* nam*s* of Rva-*s*greñ died. 1441

Yon tan *r*gya-*m*tsho of Thon-pa was born. 1442

*B*dag-chen *B*lo *R*gyan of Saskya was born. Byañ sem*s* kun *d*ga*h* *b*ssañ died. 1443

Don yo*d* *d*pal *l*dan of Sera was born.

S'e*s*rab señge of *S*narthañ, who founded the *R*gyu*d* grva tshañ of *G*tsañ and *D*vu*s*, died. Gu-jo *r*tog*s* *l*dan died. 1444

Kun *d*gah *b*de leg*s* *r*gyan *b*ssañ of *G*na*s* *r*ñiñ, who became Baso's disciple, was born. Lhariba of *R*gyu*d* *s*to*d* was born.

Lha *d*vañ *d*pal *h*byor was born. *R*ñog byañ *d*pal died. 1445

## CYCLE VIII.

Rinchhen Chho*s* *r*gyen (Chhog Lo-cháva) was born. The monastery of *B*kra-*ś*i*s* Lhun-po in *G*tsañ was founded. Nam *m*kha*h* *d*pal (Hor-*s*ton, the Lama of the Mongols) died. 1446

Byañ Chhub *r*gya-*m*tsho (of the red-cap school) of *S*tag luñ died. 1447

Chho*s* *r*gya*l* *b*stanpa (Rab *h*byam*s*-pa or doctor of divinity) of Dvag*s*po, who was S'an*s* *r*gya*s* *h*phel's disciple, was born. Kun *h*ssañ Chho*s* ñam of *R*do-rañ was born. The monastery of *S*kyi*d* tshul of Hbra*s*-yul in Sa-*s*kya was founded by San*s* *h*phel, the Rab hbyam*s*-pa. *H*jam *d*vyañ*s* chho*s* *r*je died.

Roñ*s*ton died. 1448

Khri S'i*s* dar leg*s* blo was born. The seventh Ming emperor Tsing-the ascended the throne. Leg*s* *r*gyan of Shvalu died. Guñru *r*gyen *b*ssañ died. Bodoñ phyog*s* la*s* *r*nam *r*gya*l* died. 1449

Grag*s* *r*gyan *S*gam *S*myon of *S*gampo died. 1450

*B*so*d* nam*s* *m*Chhog grub of *S*narthañ died. Shva *d*mar Chho*s* *d*pa*l* ye*ś*e*s* died. 1451

Khri-pa Chhos *b*śes was born. Khri-pa Rin *hod* was born. Chho Grag*s* Yeśes, the fourth Shva-*d*mar Lama, was born. Pañchhen Nag*s* rin visited Tibet. Karma *M*thoñ-va Don *l*dan died. Rimi *h*bab-pa died. 1452

*S*gampo *b*so*d* *r*gyan was born. The seventh Karma hierarch Chhos Grag*s* *r*gya-*m*tsho was born. 1453

Phyog*s* las *r*nam *r*gya*l* and Chhos *d*vañ Lhun-grub were born. 1454

Kun-*b*ssañ of Ñor was born. 1455

Grub Chhos *r*dorje was born.

*B*kra-śi*s* *d*pal, the Tantrik saint of the Karma school, was born. The eighth Ming emperor T'hen-srun ascended the throne of China. Byañ sems śer *b*ssañ of *S*ma*d* died. 1456

Chhos *l*dan *b*lo gros of *R*gyu*d* sto*d* was born. Panchhen Ñag *d*vañ grag*s*-pa was born at *S*ñuñ. 1457

The second Śakya *b*so*d* nam*s* of Se-spyi*l* was born. *B*kra śi*s* *d*pa*l* of *S*tag luñ died. 1459

The second *B*kra *d*pa*l* of *S*tag luñ was born. *S*ñan grag*s* of Se-spyi*l* died. 1460

Baso Chhos *r*gyan became the grand hierarch of *D*gah-*l*dan. Khri *B*lo gros Chhos *s*kyoñ died. 1462

The monastery of Goñkar *R*dorje *G*dan was founded by Thon-me kun *d*gah. 1463

The monastery of *S*kyo *m*dah *d*gonpa was founded by *H*gro *m*gon *B*lo gros *b*ssañpo of *S*kyo *m*da*h* in the eighth year of his age. The nineth Ming emperor Hwa ascended the throne of China. 1464

*B*logros *r*gya*l*-*m*tshan founded the monastery of Ñi-*s*tiñ.

*S*tag Phrugu Śrí died. Lo-chhuñ *D*ka*h* *b*shi-va died. 1465

Grag*s* don of *S*narthañ died. 1466

Panchhen Nag*s* rin died at Pa*l*po in Nepal. 1467

*B*tsun-pa Chhos *r*gyan of Sera was born. *R*nam *r*gya*l* Grag*s*-pa of *S*tag-luñ was born. The monastery of *G*ser-*m*dog chan was founded by Śakya *m*chhog. Mus-chhen *D*kon *r*gyan died.

*R*je druñ Chhos *d*vañ Grag*s* of Shañshuñ died. 1468

*B*ssañ *d*pa*l* died at *S*narthañ. *B*lo *r*gyan (Sems-*D*pa*h* chhen-po) of *B*demo thañ died. 1469

*S*mon lam *b*lo gros, the first embodiment of Sems dpa*h* of *B*demo thañ, was born. 1470

*B*so*d* nam*s* *d*pa*l* *b*ssañ of *S*tagluñ was born. The monastery of Grva Byam*s* *g*liñ was founded by Thumi Lhan *b*kra*s*. *S*pyan *S*ña *b*lo *r*gya-*m*tsho died. 1471

Khri Chhos Skyoń rgya-mtsho was born. Lha Chhos bssań of Se-spyil was born. Blo brtan became the grand hierarch of Dgah ldan. The monastery of Thub-bstan rnam-rgyal was founded by Karam-pa. Baso Chhos rgyan died. Hdul nag-pa of Snar thań died. 1472

Dge hdun grub died, and Panchhen Bssań-po bkra śís became abbot of Bkra śis lhunpo. Rñiń-ma S'akya rgyal died. 1473

Dge hdun rgya-mtsho, the second embodiment of the Rgyal-va Rin-po-chhe, was born.

Blo gros Grags dpal (Hdul hdsin) died. Byams pa Gliń-pa died. 1474

Ssla-va rgyal mtshan of Stoń skor, an incarnation of Hdul hdsin grags rgyan, was born. Kun dpal of Hbrug-pa school died. 1475

Kun dgah legs blo of Sgom-rum was born. 1476

Khri-pa Panchhen bsod Grags, an incarnation of Bu-ston, was born. Bssań bkra having died, Luń rig rgya-mtsho became abbot of Bkraśis lhunpo. Ko-ram bsod Seńge founded the monastery of Thub-bstan rnam rgyal glin. Khri Blo brtan died. 1477

Ssur-mań Bya btań-pa was born. At the sixty-first anniversary of Tsońkhapa, a religious controversy took place at Rtse-śar. 1478

The Rtse śar controversy having terminated, Smon lam dpal became the grand hierarch of Dgah ldan. 1479

The Lama Shva dmar led the Tsań army to Dvus. Hgos Lo-cháva Gshon-dpal died at Yid rtse. 1480

Ñag-dvań Hjigs med Grags of Rin spuń was born. Lo-cháva bsod rgyam was born. 1481

In the sacred chronology of Nor bssań rgya-mtsho the 712th year of the second age expired. 1482

Byams Chhen Rab hbyams died. 1484

Talai Lama Dge-hdun rgya-mtsho entered monkhood. Grags śes rab became abbot of Snarthań. Kungrul of Rgyud stod died. 1485

Dpal bssań of Se-spyil died. Hphags-pa lha of Khams died. 1486

Sgam-po bsod lhun died. Huńti, the tenth Ming emperor, ascended the throne of China. Sgam-po bsod rgyan died. 1487

Lo-cháva Rinchhen bssań of Shvalu was born. The monastery of Ñan yod śańs chhos sde of Sa-skya was founded by Hbum phrag gsum-pa. Gor rampa Bsod Seń of Sa-skya died. 1488

Blo bssań Ñima became grand hierarch of Dgah ldan. The

monastery of Thub-*b*stan Yañs-pa-chan was founded by Rab *h*byams-pa Thug-*r*je *d*pal of Mus. 1489

Khri Mi ñag *r*dorje *b*ssañ-po was born. Khri *S*mon lam *d*pal died. 1490

Khri-pa *D*von-po *B*lo *b*ssañ Ñima died. 1491

Khri Chhos grags *b*ssañpo was born. Khri *D*ge-*h*dun *b*stan-dar was born. 1492

The work, called *B*ka*h* *g*dams Chhos *h*byuñ *G*sal *s*gron, was written by Las Chhen kun *d*gah *r*gyal *m*tshan. 1493

Kun *d*gah Gro*l* *m*chhog, the head of the Jonañ school, was born. 1494

Thonmi Kun*d*ga*h* *r*nam *r*gyal died. Kun*d*ga*h* *b*de legs of *G*nas *r*ñiñ died. Ñag Grags of *S*tag-luñ died. 1495

Khri *r*gyan *b*ssañ was born. 1496

Rinchhen *S*puñpa of *G*tsañ, after taking *S*ne*h*u *r*dsoñ, took possession of *S*pyi*d* S'añ.—At the grand annual prayer meeting (Monlam Chhenpo) of Lhasa the Lamas of the *G*sañ-phu and Karma schools humiliated those of the Sa-*s*kya-pa and *H*bras *s*puñ schools. Khri ve *b*ssañ died. 1497

Karma Grub thob *B*kra *d*pal of *G*ñan founded the hermitage of Orgyan Rikro*d*. 1498

*H*darston became grand hierarch of *D*ga*h* *l*dan. Panchhen *m*chhog Lhapa died. 1499

Khri ñag *d*vañ Chhos Grags was born. 1500

*B*lo *g*sal *r*gya-*m*tsho of Tshar-chhen was born. *S*gom-*s*myon died. 1501

*H*jam *d*ga*h* *l*o died. Kun *d*gah Chhos *b*ssañ, the abbot of *S*kyi*d* tshal, died. *D*pa*h*-po Chhos *d*vañ Chun Grub died. 1502

The second *D*pa*h*-po *G*tsug-lag phreñ-pa, the astrologer and chronologist, was born. *H*bum phrag, *G*sum-pa of Sa-*s*kya, died. 1503

Khri *D*ge-legs *d*pal of *H*ol *d*ga*h* was born.

The third incarnation of the Panchhen Rin-po chhe, named *B*lo *b*ssañ don grub, was born.

The sage Phyogs las *r*nam *r*gyal was born. Tiñ-te, the eleventh Ming emperor, ascended the throne. 1504

Karma Chhos Grags *r*gya-*m*tsho died. 1505

## CYCLE IX.

Mi *b*skyo*d* *r*dorje, the eighth Karma hierarch, was born. Sañs *r*gyas *d*pal, the second incarnation of *H*phags-pa lha Khams, was born.

S'er-*b*ssañ died at Byañ *r*tse. S'akya *m*chhog of Sa-*s*kya died. 1506

The second *B*kra *d*pal of *S*tag-luñ died. 1507

*D*ge-*h*dun *r*gya-*m*tsho founded the monastery of Chhos *h*khor-*r*gyal in the plain of *R*gyal Metog thañ. 1508

Chos *l*dan *b*lo gros of *R*gyud *s*tod died. Khri *H*dar *S*ton *b*lo *b*ssañ grags-pa died. 1510

*B*lama rinpochhe *D*ge-*h*dun *r*gya-*m*tsho became the grand hierarch of *B*kra śis lhunpo. 1511

Panchhen *B*kra śis *r*nam *r*gyal of *S*gampo was born.

*M*khas grub Nor *b*ssañ *r*gya *m*tsho was born. 1512

*D*pal *b*lo of Sera died. 1513

The Panchhen died at *S*ñug. 1514

Khri Byams-pa *r*gya-*m*tsho was born. *B*sod nams *D*vañ *r*gyal of *S*gampo was born. Lharipa of *R*gyud *s*tod died. 1515

The grand Lama *D*ge-*h*dun *r*gya-*m*tsho became abbot of *H*bras *s*puñs.

Khri Rin *h*od-pa wrote a treatise on the chronology of the Buddhists. 1516

The power of *G*tsañ-pa, having waned since the year *fire-mouse*, the monasteries of Sera and *H*bras spuñ recovered their place in the Monlam Chhenpo, the grand prayer assembly of Lhasa. 1517

Thub *d*vañ *b*stan *h*dsin of *S*gampo was born. Kun-*dgah* *d*pal of Ñañ, who was born in the year *fire-ox*, became abbot of Chhab-*m*do. 1518

Khri Tshe-*b*rtan *r*gya-*m*tsho was born. *B*sod *d*pal of *S*tag luñ died. 1519

Grub-chhen Chhos *r*dorje made over the book of miraculous revelations of Tsoñ khapa to the Talai Lama *B*lo-*b*ssañ Don grub. Thon-pa Yon-*r*gya-*m*tsho died. Grub thob of *G*ñan, having died, was re-born in the same year. 1520

Kya-Jiñ, the twelveth Ming emperor ascended the throne of China. 1521

Khri dam Chhos *d*pal *h*bar was born. 1522

*H*jam *d*vyañs *m*khyen *b*rtse *d*vañ phyug was born.

*R*nam *r*gyal *b*kra śis of *S*tag luñ was born. Don yo*d* *d*pal *l*dan of Sera died. Chhos kyi Ñima of *R*do-roñ died. Rab *b*byams-pa of Dvags-po died. Chhos Grags Yeśes of the Shva-*d*mar school died. 1523

*M*khas grub Sans *r*gyas Yeśes was born. *D*kon *m*chhog yanlag, the fifth Shva *d*mar hierarch, was born. 1524

Khri *D*pal *h*byor *r*gya *m*tsho was born. Metri Dongrub *r*gyal *m*tshan of Bo*d m*khar was born. 1525

*B*so*d* nam*s* Chho*s h*phel of *D*gon *G*sar was born. *H*brug-pa Pa*d*ma *d*karpo, the great antagonist of Tsoṅkhapa, was born. The sixteenth Kulika (fabulous emperor), named *D*pal *s*kyoṅ (S'rí-pála), ascended the throne of S'ambhala. The great Shalu Lo-cháva was born. 1526

*B*so*d* Grag*s*-pa became the grand hierarch of *D*ga*h l*dan, and wrote the Buddhist historical work called *B*ka*h g*dan Chho*s h*byuṅ. 1528

Khri S'esrab leg*s b*lo died. *R*nam *r*gya*l* Grag*s*-pa of *S*tag luṅ died. 1529

The foundation of the monastery of Phan *b*de *d*gon was laid by San*s r*gya*s b*kra *ś*i*s*, the father of *H*phag*s*-pa lha the second. 1530

Khri *D*ge *h*dun *r*gya*l m*tshan was born. *S*gom *l*de *r*nam *r*gyan of *R*gyu*d s*to*d* S'ar-va was born. 1531

*R*gya*l m*tshan *b*ssaṅ-po became abbot of *R*gyu*d*-sma*d*. 1532

*S*paṅ *d*kar Rinpochhe was born. 1533

Tharpa*h*i *r*gya*l m*tshan, also called Naga grub-chhen, was born.

Chho*s r*gya-*m*tsho became the grand hierarch of *D*ga*h l*dan. 1534

Kun-*b*kra of *S*tag luṅ was born. The work on astrology and astronomy, called *R*tsi*s g*shuṅ, was composed by *G*tsugla phreṅ-va. 1535

*R*je-druṅ Lha *d*vaṅ Chhos *r*gyan, the incarnation of Baso Chho*s r*gyan, was born. The abbotship of Sera was filled by *R*je *b*tsun-pa. The *H*briguṅ authorities dispossessed the *D*ge *l*dan-pa hierarch of eighteen communities, Ho*d s*na &c. 1536

*R*do*r b*ssaṅ of Miñag became the grand hierarch of *D*ga*h l*dan. Khri Chho*s s*kyoṅ *r*gya-*m*tsho died. Karma *H*phrin la*s* pa died. 1538

Khri San*s*-*r*gya*s* Rinchhen was born. Khri-pa Chho*s b*ś*e*s died. Khri-pa Rin *h*o*d* died. Bya *b*taṅ of Ssur maṅ died. 1539

*R*nam *r*gya*l D*pal *b*ssaṅ of *R*gyu*d S*ma*d* was born. *M*khan chhen nam *r*gyam was born. The monastery of *M*ña*h* ri*s* Grva-tshaṅ was built on a hill near *R*tse-thaṅ. 1540

The Talai Lama *D*ge-*h*dun *r*gya-*m*tsho died. 1541

The third Talai Lama *B*so*d* nam*s r*gya-*m*tsho was born. 1542

The monastery of Phan *b*de *G*liṅ was founded. Kun leg*s* of *S*gom rum died. 1543

Khri Chho*s* ñer Grag*s* was born. Khri *B*lo *r*gyam of *S*tag

luñ Brag was born. Khri Damchhos *d*pal was born. *R*je *b*tsun-pa died. The monasteries of Tshal Guñthañ and *S*tag luñ lha khañ were destroyed by fire. 1545

*R*je-druñ S'er *d*vañ founded the monastery of Dar *r*gyas in Khams. Ñag *d*vañ Chhos Grags became grand hierarch of *D*gah *l*dan. 1547

*R*je *b*sod nams *r*gya *m*tsho entered monkhood. 1548

The monastery of *B*shad *s*grub *g*liñ in Khams was founded by Baso *s*pru*l* *s*ku. *R*nam *r*gya*l* Phun-tsho became abbot of *S*tag luñ. 1549

Khri Ñag-*d*vañ Chhos Grags died. 1550

Chhos Grags *b*ssañ-po became grand hierarch of *D*gah *l*dan. *S*gampo *B*sod lhun died. 1551

Mi *G*yo *S*ñiñ-po (*R*je-druñ tsha-wa-pa), who was born in the year *fire-serpent*, was appointed to the abbotship of Chhab-*m*do. Sems *d*pah *S*mon lam *B*lo gros died. *S*gam-po *b*sod nams *D*vañ-*r*gya*l* died. 1552

The second incarnation of Sems-*D*pah, named Ñag *d*vañ Grags *r*gyan, was born. Khri *B*sod nams Grags-pa died. Khri Miñag *R*dor *b*ssañ died. Karma Mi *b*skyos *r*dorje died. 1553

Khri-pa Grags-pa *r*gya-*m*tsho was born.

Khri-pa Grags-pa *r*gya-*m*tsho was born. Kun-*b*kra Locháva filled the abbotship of *S*tag-luñ. His father Sañs *b*kra died. 1554

The ninth Karma incarnation, named *D*vañ-phyug-*r*dorje, was born. The first incarnation of *B*sod nams Grags-pa, named *B*sod nams ye *d*vañ, was born. *S*toñ *s*kor Ssla *r*gyan died. 1555

Yontan *r*gya-*m*tsho of *S*toñ-*s*kor was born.

*D*ge-*h*dun *b*stan *r*gyam, the incarnation of *R*je-druñ *S*ñags ram-pa (*D*ge-*B*kraśis), was born. 1556

*D*ge-leg*s* *d*pal of *H*ol *d*gah became grand hierarch of *D*gah *l*dan. *D*vañ phyug rab-*b*rtan of *G*nas *g*sar was born. *B*sod nams *r*gya*m*tsho became the abbot of the Sera monastery. 1557

*D*kon-*m*chhog *r*gya-*m*tsho of Sre (Hre) *r*gyu*d* monastery was born. *B*dag Chhen *B*sod *d*vañ was born. Khri-pa Chhos Grags *b*ssañ-po died. 1558

*R*je druñ S'esrab *d*vañ-po of *R*gyañ S'o*d* held the abbotship of Chhab-*m*do. 1559

Khri-pa Tshul Khrims Chhos *h*phel was born. 1560

Thub-*d*vañ *b*stan *h*dsin of *S*gampo died. 1561

Shva lu Locháva Riñ-*b*ssañ died. *R*nam *B*kra of *S*tag luñ died. 1562

The incarnate Lama Sans *r*gya chhos *h*dsin was born. *B*sod nams *r*gya-*m*tsho took the final vows of monkhood. *D*ge-*h*drun *b*stan dar became the grand hierarch of *D*ga*h* *l*dan. 1563

Tshe *b*rtan *R*do*r*je pha gus of *G*tsañ became master of the province of *G*tsañ. Panchhen *B*lo-*b*ssañ Don Grub died. 1564

S'esrab Phun-tshogs of *R*gyara was born. *G*tsug-lag *h*phreñ-va died. Kun *d*gah Gro*l* Chog died. *H*phags-pa Sans *r*gyas died.

Panchhen *R*nam tharma *B*lo-*b*ssañ Don Grub died. 1565

## CYCLE X.

The third incarnation of *H*phags-pa Lha, named *M*thoñva don *l*dan *b*sod nams *r*nam *r*gyal *d*vañ po *h*i *s*de, was born. The eighteenth Ming emperor Hwañ-ti ling Chhing ascended the throne of China. Khri *D*ge legs *d*pal died. Tshar-Chhen *b*lo *g*sal died. 1566

The third *D*pa*h*-vo Karma *S*tsug lag *r*gya-*m*tsho was born. Tshe-*r*ten *r*gya *m*tsho became grand hierarch of *D*ga*h* *l*dan. Khri *D*ge *h*dun *b*stan dar died. 1567

Chhos *r*gyan of the *G*nas *r*ñiñ monastery became abbot of *B*kra *ś*is lhunpo. 1568

The fourth Panchhen (Taśi Lama) *B*lo *b*ssañ Chhos kyi *r*gyal *m*tshan was born S'er *d*vañ became abbot of Chhah *m*do for the second time. A dispute between *H*bri Guñ and *S*tag luñ took place. 1569

According to his biography Panchhen *B*lo *b*ssañ Chhos *r*gyal *m*tshan was born in this year. 1570

*S*gampo Khri-pa *B*kra S'is kun Grags was born. *M*khanpo Ñag *d*vañ Chhos Grags was born. At *S*kyid S'oñ the Phag-gru dispute took place. Sems *d*pa*h* *s*prul *s*ku Grags *r*gyan died. 1571

Khri *D*kon *m*chhog Chhos *h*phel of *G*liñ *S*mad was born. The third embodiment of Sems *d*pal *s*prul *s*ku Ñag *d*vañ Chhos *r*gya *m*tsho was born.

The fourteenth Ming emperor Wan li S'iñ kya ascended the throne of China. 1572

S'ar-va nam *r*gyan-pa governed *R*gyu*d* *s*to*d*. Talai Lama *B*sod nams *r*gya-*m*tsho founded on Potala the monastery of *R*nam *r*gyal Grva-tshañ which afterwards was converted into a *R*ñiñ ma institution. 1573

*G*sal khañ *s*prul *s*ku Chhos *r*gyan, who was an incarnation of Khri *D*ñag-*d*vañ Chhos Grags, was born. Lama Táránátha Kun *S*ñiñ of the Jonañ school was born. Byam-*r*gyam became

the grand hierarch of *Dgah ldan*. The armies of Rin *spuń*, after invading *Dvus*, returned to *Gtsań*. 1574

Khri Tshe *brtan rgya-mtsho* died. Talai Lama *Bsod nams rgya-mtsho* proceeded to Mongolia. 1576

*Bstan hdsin* phun tshogs of *Mgar* dam was born. The monastery of *Sku-hbum* (Kumbum) was founded at the birth-place of Tsoń-khapa. Althan Khan received the Talai Lama *Bsod nams rgya-mtsho*, who in the following year founded the monastery of Theg Chhen Chhos *hkhor gliń*. 1577

Baso Lha *dvań* became abbot of Chhab *mdo*. According to the directions of the Talai Lama *Bsod nams rgya-mtsho*, the incarnate Lama *Bsod nams* ye *dvań* founded the monastery of Thub-chhen Chhos *hkhor* of *Sbom hbor* in Lithań. 1579

Talai Lama *Bsod nams rgya-mtsho* visited Chhab *mdo*. Internal disputes raged at *Hbriguń*. 1580

Sans *rgyas* yeśes gave the vows of monkhood to Panchhen Rinpochhe. *Dpal hbyor rgya-mtsho* became the grand hierarch of *Dgah ldan*. Guśrí Khan of Hor was born. 1581

*Dkon mchhog* yan lag the Shva-*dmar* Lama died. 1582

The sixth Shva-*dmar* Lama, named Gar *dvań* Chhos kyi *dvań* phyug, was born. 1583

The abbot of *Stag luń*, named Ñag *dvań rnam rgya*, became abbot in the 15th year of his age. 1584

*Mkhas* grub *Hphags*-pa S'akya lha *dvań* was born. 1585

*Sgam*-po *Bkraśis rnam rgyal* died. Bo*d mkhar* Don-grub died. 1586

*Hjam dvyańs rgya-mtsho* and *Rgyal*-va *rgya-mtsho* of *Stod skor* were born. Talai Lama *Bsod nams rgya-mtsho* died. 1587

The fourth Talai Lama Yon-tan *rgya-mtsho* was born in Mongolia. The *Dgah ldan* abbotship was held by Dam-chhos of *Dpal hbar*, and the *Rgyud smad* hierarchical chair was filled by *Rnam rgyal dpal bssań*. 1588

*Blo bssań rgya-mtsho*, the physician of *Gliń Stod* in *Gsań*-phu, was born. Khri Byams *rgya-mtsho* died. *Mkhas* Grub Sans *rgyas* Yeśes of *Dven*-sa died. 1589

*Dge-hdun bssań rgya-mtsho*, the incarnation of Khri Byams, was born. *Blo bssań* Ñag *dvań* of *Sgo-mań* was born at *Bsam grub sgań*.

The Panchhen Rinpochhe took the final vows of monkhood. 1590

Yeśes *rgya-mtsho*, the first incarnation of Sans *rgyas* Yeśes of *Dven*-sa, was born. S'ar-va Nam *rgyan* of *Rgyud Stod* died. The incarnate Lama *Bsod nams* ye *dvań* died. 1591

The *H*brug-pa Lama *D*pag *b*sam *d*vaṅ-po was born. 1592

*B*so*d* nam*s d*ge-leg*s*, the second incarnation of *B*so*d* nam*s* Grag*s*-pa, was born. *H*phag*s*-pa *m*thoṅ-va-don *l*dan held the abbotship of Chhab-*m*do. Guśrí of Hor overrun *M*go *d*kar. 1593

*B*lo *m*Chhog *r*dorje of *S*man luṅ was born. *D*pon (Governor) *B*so*d* nam*s* Chho*s h*phel, also called Rab *b*rtan, was born. 1594

Da-yan Khan, son of Guśri Khan, was born. San*s r*gya*s* Rinchhen filled the grand hierarchical throne of *D*ga*h l*dan. 1595

Kun *d*gah *b*so*d* nam*s* the *B*dag chhen (hierarch) of Sa*s*kya was born. 1596

Khri *D*pal *h*byor *r*gya-*m*tsho died. Khri Dam chho*s d*pal *h*bar died. The abbot of *S*gampo, *B*kra *ś*i*s* Kun grag*s*, died. Kun *b*kra of *S*tag luṅ died. 1598

The Panchhen ascended the throne of *B*kra *ś*i*s*-lhunpo. *M*khan chhen nam *r*gyan died. 1599

Chho*s h*byor *r*gya-*m*tsho, the incarnation of Khri *d*pal *r*gyam, was born at Thaṅ-riṅ. Karma *D*vaṅ phyug *r*dorje died. 1600

Khri Nam dag *r*dorje *b*lo *b*ssaṅ don yo*d* was born. *D*kon *m*chhog yar *h*phel of the Sre *r*gyud-pa monastery was born. *B*so*d* nam*s m*chhog grub of Shvalu was born. *R*nam *r*gya*l d*pal *b*ssaṅ of *R*gyu*d s*ma*d* died. 1601

*M*khan-po *B*so*d* nam*s m*chhog grub was born. N̂ag *r*gyan became grand hierarch of *D*ga*h l*dan. The Talai Lama Yontan *r*gya-*m*tsho was brought to Tibet from Hor, and being given the vows of monkhood by the retired hierarch of *D*ga*h*-*l*dan, presided over the monasteries of *H*bra*s* spuṅ and Sera. 1602

The tenth Karma hierarch Chho*s d*vyin*s r*dorje was born.

Chho*s d*vyin*s* raṅ Grol, the *R*ñiṅ-ma Lama, was born. *R*gya*l s*ra*s* Don *r*gyan-pa founded the *D*gon-luṅ monastery of Amdo. Sem*s d*pa*h* N̂ag *d*vaṅ Grag*s r*gyan died. Ye*ś*e*s r*gya-*m*tsho, the incarnate Lama of *D*ven-sa, died. Baso Lha-*d*vaṅ died. *H*phag*s*-pa *m*thoṅ-va don *l*dan died. 1603

N̂ag *d*vaṅ phun-tsho*gs r*nam *r*gya*l*, the incarnation of Sem*s d*pa*h*, was born.

*B*lo *b*ssaṅ *b*stan *h*dsin *r*gya-*m*tsho, the second incarnation of *D*ven-sa, was born. Chho*s* kyi *r*gya*l*-po *r*nam *R*gya*l r*gya-*m*tsho, the fourth incarnate *H*phag*s*-pa of Kham*s*, was born. Baso-*R*je-druṅ (Lha-*d*vaṅ chho*s d*van phyug) died. The fort of *S*kyi-ś*o*d *s*gar was destroyed by the Karma armies. Chho*s r*gyan, the incarnate Sem*s d*pa*h*, died. 1604

Guśrí Khan effected a reconciliation between the Oe-loth and Khalkha Mongols, who were quarrelling on account of a

question of precedence between the grand hierarchs of *Dgah ldan* and of Stoń *skor* shabs druń named *Rje-btsun* dam-pa. For this service he received the title of Guśrí. 1605

The fourth incarnation of Sems *dpah* Ñag *dvań* phun-tshogs *rnam rgyal* was born. The grand hierarchical throne of *Dgah ldan* was filled by Chhos ñer, also called *Bśes gñen* grags. Khri *Dge-rgyan* died. 1606

Táránátha wrote his *Rgya-gar* chhos *hbyuń* "Rise and progress of Buddhism in India." 1607

*Spań dkar* Rinpochhe died. 1607

*Dkon-mchhog rgyal mtshan*, of the monastery of *Sre-rgyud* near *Bkraśis* lhunpo, was born. Dam chhos *rgya-mtsho* of Pa-chhe, the teacher of Sumpa, became abbot of *Stag-luń*. Ñag *dvan rnam rgyal* of *Stag* luń wrote the work, called Chhos-*hbyuń* (history of Buddhism). 1608

*Bkra-śis* grags *rgyam* of *Sgampo* was born. Don yod chhos kyi *rgya mtsho*, the incarnation of *Rgyal sras*, returned to *Dvus*. The armies of *Gtsań* invaded *Dvus* and withdrew. 1609

The Grva-tshań monastery of Amdo was founded by Likya S'er *mchhog*. 1610

*Hdul-va* chhos *rje hod rgyam-pa* reduced the monastery of *Sku-hbum* into a *Gtsań* institution. The Karma hierarch Phun-tshog *rnam rgyal* became the lord temporal and spiritual of *Gtsań*. Khri Sans rin died. 1611

The Panchhen Rinpo-chhe presided over the Monlam chhenpo (prayer congregation) of Lhasa between this and the year *earth-horse*. 1612

Talai Lama Yonton *rgya-mtsho* took the final vows of monkhood from the Panchhen Rinpo-chhe. 1613

*Blo rgya-mtsho* of *Stag brag* filled the grand hierarch's chair of *Dgah ldan*. Phun-tshogs *rnam rgyal* of Gro-tshań ka riń became abbot of *Dgon luń* Byams *gliń*. The incarnate Lama *Bsod* nams *dge* legs *dpal* died. 1614

Talai Lama Yonton *rgya-mtsho* died. 1615

Talai Lama Ñag *dvań blo bssań rgya-mtsho* was born. The Panchhen Rinpo-chhe became abbot of *Hbrags spuń*.

*Bkra-śis* Phun-tshogs, also called Lha-pa chhos *rje*, held the abbotship of *Dgon luń*. Yap Sans *rgyas* chhos *hdsin* died. 1616

Khri Byams *bkra* was born. The incarnate Yap Lama Sans ye was born. Dam chhos *dpal* filled the grand hierarch's chair at *Dgah ldan*. The *Gtsań* army beseiged Sera and *Hbras spuń*, and killed many thousand monks. Khri chhos ñer grags died. Khri *Blo-rgya-mtsho* died. 1617

The third incarnation of *B*sod grags, called Grags *r*gyan of *G*ssims khañ goñ-ma, was born. Chhos *h*byor *r*gya-*m*tsho, the incarnate Lama of Thañ-riñ, died. 1618

*B*sod nams chhos *h*phel filled the grand hierarch's chair at *D*ga*h*-*l*dan.

The Mongol and *G*tsañ armies fought with each other at *R*kyañ thañ *s*gañ, where many Tibetans fell. 1619

Khri Dam chhos *d*pal died.

Sumpa *s*lo-*d*pon-pa chhe-va a second time held the abbotship of *D*gon luñ. The fifteenth Ming emperor Then-chhi ascended the throne of China. The Mongols defeated the *G*tsañ armies at *R*kyañ thañ *s*gañ, and thereby restored lost territories to *D*ge-grags-pa. 1620

The Mongol *H*phrin las lhun-grub, also called *S*min grol Nomen khan, was born. Talai Lama *B*lo *b*ssañ *r*gya-*m*tsho became abbot of *H*bras *s*puñ. 1621

The Panchhen Rinpochhe erected the golden spire of the shrine of *B*chug-chig-shal. Grags *r*gya-*m*tsho became the grand hierarch of *D*ga*h* *l*dan. After his death the hierarchical chair was nominally filled by Ñag *d*vañ chhos *r*gyan.

Khri-Tshul Khrims chhos-*h*phel died. 1622

Talai Lama *B*lo *b*ssañ *r*gya *m*tsho took the final vows of monkhood. 1623

*D*kon *m*chhog chhos *h*phel became the grand hierarch of *D*ga*h* *l*dan. Panchhen became the abbot of the Byan *r*tse college. 1625

## CYCLE XI.

The eighteenth Kulika emperor ascended the throne of *S*'ambhala. *H*jam-pa chhos *r*je (Chhos *r*gya-*m*tsho-va) became abbot of *D*gon luñ. 1626

This year a little decrease was observed in the solar brightness, and there being an entire eclipse of the moon, the whole phenomenon was considered as ominous by *D*pal lhun of Pha boñ kha. The sixteenth Ming emperor Khuñ-tin ascended the throne of China. *D*kon-*m*chhog *r*gya-*m*tsho of the *S*re *r*gyu*d* monastery died. 1627

Panchhen chhos *r*gyan built a gilt dome on the monastery of *D*ga*h* *l*dan. 1628

*L*chañ *s*kya Chhos *r*je grags-pa *h*o*d* sser became abbot of *D*gon-luñ. 1628

The monastery of Roñ-po was founded by *S*kal *l*dan *r*gya-

*m*tsho, also called Roñ-po grub chhen of Amdo. The Shva *d*mar Lama Gar-*d*vañ died. *D*pa*h*-vo *G*tsug lag *r*gya-*m*tsho died. 1629

The seventh Shva-*d*mar hierarch was born. 1630

Khri Chona*s*-pa was born. *R*gya-ra S′e*s*rab Phun-tsho*g*s died. 1631

Sumpa *S*lo-*d*pon-pa Dam-chho*s* *r*gyal *m*tshan became abbot of *D*gon-luñ. 1632

The incarnation of *S*gampo, called Nor *r*gyan, died.

Khri *B*lo gro*s* *r*gya-*m*tsho was born. *B*lo *b*ssañ *b*stanpa*h*i *r*gya*l* *m*tshan was born. 1634

*S*gampo *B*kra śi*s* grag*s* *r*gyam died. 1635

*L*dan-ma *s*mon lam rab *h*byor-pa (Tshul-khrim*s* *r*gya-*m*tsho) became abbot of *D*gon-luñ. Guśrí chho*s* *r*gya*l* entered Kokonur, and defeating the armies of the Khalkha tribes who were inimical to the *D*gelug-pa school, proceeded towards *D*vu*s*, from which place he returned to Kokonur. 1636

*H*khon-*s*ton *d*pal lhun died.

*B*stan *h*dsin leg*s* *b*śad of Koñ-po became hierarch of Dga*h* *l*dan, but he could not long hold the office and was obliged to resign it. *R*je-Dge rin succeeded him. The Talai Lama and the incarnation of *G*ssim khañ Goñma took the special vows of *S*ma*d* *h*dul *d*ge *s*loñ from Panchhen thams cha*d* *m*khyen-pa. 1637

Ñag-*d*vañ *b*stan *H*dsin *H*phrin la*s* (*S*kyid śoñ shab*s* druñ) was born. *R*nam *r*gya*l* *d*pal *h*byor (Chhos-*b*ssañ *s*ku goñ-ma) became abbot of Dgon-luñ. Guśrí chho*s* *r*gya*l* subdued Beri, the chief of Kham*s*, and annexed his possessions. 1638

S′akya lha *d*vañ wrote the historical work, called Chho*s* *H*byuñ. King Beri of Kham*s*, being a follower of the Bon religion, was declared a common enemy of the Buddhist religion. He was thrown into prison and punished with death. 1639

*M*khan-po Ñag *d*vañ chho*s* grag*s* died. 1640

*L*chañ *s*kya Ñag *d*vañ chho*s* *l*dan *d*pal *b*ssañ-po was born.

*H*phag*s* shi-va *b*ssañ-po, in the 44th year of his age, became abbot of Chhab *m*do. Guśrí khan entered *G*tsañ and captured the king of *G*tsañ and annexed *G*tsañ koñ to his dominions. He was proclaimed king of Tibet. The governor *B*so*d* nam*s* chho*s* phel became regent. 1641

*B*lo-*b*ssañ *b*stan *h*dsin *H*phrin-la*s* of Khalkha was born.

*B*stan-pa *r*gya*l*-*m*tshan of *D*vag*s*-po became hierarch of Dgah-*l*dan. 1642

*H*phag*s*-pi chho*s* *r*gya*l* died.

*Rgyal*-va *rgya-mtsho*, the fifth incarnate *Hphags*-pa of Khams, was born. Six great nobles of China conspired against the emperor Khruñ tin, and their leader usurped the imperial authority for a fortnight, after which the Manchu chief Sun-t'i Chhi-the tsuñ took possession of the imperial crown. 1643

The famous palace of Potala was built. 1644

The monastery of Ma-*mgur* in Amdo was founded by Lamo *sprul sku Blo-gros rgya-mtsho* and *Hod* sser bkra *śis*. Khri *dkon mchhog-chhos hphel* died. 1645

Khri *Dvags* po died. 1646

The spiritual teacher of the author (Sumpa *mkhanpo*), named *Hjam-dvyañs-bshad*-pa (Ñag-*dvañ brtson grus*), was born. *Dkon-mchhog chhos bssañ* filled the hierarchical throne of *Dgah ldan*. Hor Don grub *rgya-mtsho* became abbot of *Dgon*-luñ. 1647

The abbot of *Sgo*-mañ, named *Bsam grub Sgañ*-pa Ñag *dvañ blo bssañ dvyiñ chhos*, became abbot of *Dgon*-luñ. He afterwards accepted the abbotship of Rva-*sgreñ* in *Dvus*, in consequence of which Don yo*d rgyal mtshan* of Hor duñ succeeded him in the *Dgon* luñ abbotship. 1649

Leg*s rgya-mtsho* established a Tantrik school in the monastery of *Sku-hbum*. The monastery of *Dgah ldan* Dam chhos *gliñ* of *Btsan*-po was founded by the retired abbot of *Dgon* luñ at *Sser khog*. 1650

The Talai Lama visited China (Peking), and was there decorated with the insignia of Tai Śrí by the emperor Shun-t'i. 1651

The *Sde-srid* (viceroy) San*srgyas rgya-mtsho* was born. *Hod* Sser *Bkra śis* held the abbotship of *Dgon* luñ. The Talai Lama, on his return journey from China, visited the monasteries of *Dgon*-luñ, &c. 1652

*Dpal ldan rgyal mtshan* filled the chair of the grand hierarch at *Dgah ldan*.

Guśrí khan died. 1653

Emperor Khang-shi (*Bde-skyid*), known to the Tibetans as an incarnation of Grag*s rgyal mtshan*, was born. S'akya Lha *Dvañ* died. 1654

Tharpa Chho*s rje* (*Bkra śis rgyal mtshan*) became abbot of *Dgon*-luñ.

The *Rñiñ*-ma Lama (Ssur-chho*s dvyiñs* Rañ-grol) died. 1656

Guśri's son Ta-yan khan became king of Tibet. *Hphrin las rgya-mtsho* became *Sde-srid* (viceroy). 1659

Don-yo*d chhos* grag*s* of Lu-hukya became abbot of *Dgon*-luñ. 1660

*B*lo-*b*ssañ *r*gya*l*-*m*tshan filled the throne of *D*ga*h l*dan.

The second Manchu emperor Kang-shi (*S*hiñ-tsu) ascended the throne of China. Panchhen *B*lo-*b*ssañ chho*s r*gyan died at Nag-*s*sla. 1661

The fifth Panchhen Rinpochhe (*B*lo-*b*ssañ ye*ś*e*s d*pa*l b*ssañ), who was Sumpa *m*khanpás spiritual guide, was born. *S*go-mañ *B*sam grub *s*gañ-pa died. 1662

The incarnation of *R*gya*l sres*, named *B*lo *b*ssañ *b*stan *h*dsin, arrived at *D*gon-luñ. The abbotship of *D*gon-luñ was held by *D*pa*l l*dan *r*gya-*m*tsho of *B*de *r*gyu-chha-va. Hor *D*ka*h b*chu, being invested with the title of No-men khan, returned to *B*tsan *d*gon from *D*vu*s* and established *H*chha*d* ñan. The period of Tshul khrim (śíla) commenced. 1664

Ñag *d*vañ *H*phrin la*s*, who was born in the *fire-sheep* year, and who had previously filled the abbotship of Chhab-*m*do, died this year. Spru*l s*ku grag*s r*gyan died. 1666

*B*lo-*b*ssañ Don yo*d* filled the hierarch's chair at *D*ga*h l*dan. Ta-yan khan died. The *S*de *srid* (viceroy) *H*phrin la*s* died. 1667

*M*chho*d d*pon *s*de-ba became *S*de-*srid* (viceroy). 1668

Talai khan Ratna became king of Tibet. *B*lo-*m*chhog of *S*man-luñ died. 1670

Thu-*b*kwan chho*s*-*r*je (*B*lo-*b*ssañ rab *br*tan) became abbot of *D*gon-luñ. Khri *B*lo-*b*ssañ *r*gya*l m*tshan died. 1671

Khri-*d*kon-*m*chhog chho*s b*ssañ died. 1672

Karma chho*s D*vyin*s r*dorje died. 1673

Byam*s* pa *B*kra *ś*i*s* filled the hierarch's chair of *D*gah *l*dan. Likya *D*pon *s*lob *B*lo-*b*ssañ *r*gya*l m*tshan became abbot of *D*gon-luñ. *B*lo-*b*ssañ *s*byin-pa became viceroy of Tibet. 1674

Ñag *d*vañ *B*lo-*b*ssañ *r*gya-*m*tsho took the vows of the *S*tod *h*dul *D*ge*s*loñ of Tibet for individual emancipation. 1676

Khri *B*lo-*b*ssañ of Don yo*d* died. 1677

The layman Sañ*s r*gya-*m*tsho, who was born in Groñ-*sma d*, became viceroy of Tibet. 1678

The abbotship of *D*gon-luñ was held by Rinpochhe *B*stan pa*h*i *r*gya*l m*tshan (chhu-*b*ssañ *s*prul *s*ku). The monastery of Lamo *B*de-chhen was founded by Chha-kwan Nomen-khan. 1679

A long tailed comet was seen from *M*ña*h* ri. Shvalu *B*so*d* nam*s* died. 1680

Klu-*h*bum *r*gya-*m*tsho became hierarch of *D*ga*h*-*l*dan. A fearful earthquake took place in Tibet. The Talai Lama died.

*D*kon-*m*chhog yar *h*phe*l* of *S*re-*r*gyu*d* died. *B*stan *h*dsin *h*phrin la*s* of *S*kyid sho*d* died. 1681

The Talai Lama Tshañs *d*vyans *r*gya-*m*tsho was born. The astronomical work of *S*de-sri*d*, called Baidurya *d*karpo, was compiled. 1682

Khri Byams-pa *b*kra śis died. 1683

After the return of *B*lo gros *r*gya *m*tsho to China, Tshul khrims dar *r*gyas of Chones became hierarch of *D*gah *l*dan. 1684

Lama Rinpochhe *P*ad *d*kar *h*dsin-pa Yeśes *r*gya-*m*tsho was born. The left branch of the Oeloth Mongols and the Khalkhas, being on the verge of going to war with each other, Khri *B*lo-*r*gya *m*tsho reconciled them to each other. 1685

## CYCLE XII.

Khri chhen *B*lo-*b*ssañ *r*gya *m*tsho of Lamo of *D*gah *l*dan proceeded to Peking. 1686

*L*chañ *s*kya Tákau S'rí Ñag *d*vañ *B*lo *b*ssañ became abbot of *D*gon-luñ. *B*la-ma *B*lo-gros *r*gya-*m*tsho died at *H*bog khog. 1687

*Bs*tan pa*h*i Ñima (the *R*dorje slo-*d*pon of Sumpa *m*khanpo), who was an incarnation of Khri *B*lo-*r*gyam, was born. 1688

*R*do-pa Rab Byams-pa (*D*pal *l*dan *r*gya-*m*tsho) became abbot of *D*gon luñ. 1689

*B*sam-*b*lo *s*byin-pa *r*gya-*m*tsho of *B*ka*h* *h*gyur became hierarch of *D*gah-*l*dan. 1691

The *B*de-*r*gyu chhuñ-va, named Kun-*dgah* *r*gya-*m*tsho, became abbot of *D*gon-luñ. 1692

The *S*de-sri*d* (viceroy) San*s* *r*gya *r*gya-*m*tsho built the nine storeyed palace of worship (Pho dra*ñ*-*d*marpo) of Potala. The annual prayer congregation called Tshog*s*-*m*chho*d* *S*mon lam was established by the *S*de-sri*d* to commemorate the anniversary of the accession of the Talai Lama Ñag *d*vañ *b*lo *b*ssañ. 1693

Chone Tshul-dar became hierarch of *D*gah-*l*dan. 1694

*B*lo-*b*ssañ Ñag-*d*vañ *H*jig*s* me*d*, an incarnation of *R*gyal *s*ras Rinpochhe, was born. 1695

The *S*de-sri*d* (viceroy) San*s* *r*gya*s* *r*gya-*m*tsho wrote the work, called Boiser shva ser chho*s* *h*byuñ, *i. e.*, history of the rise of the yellowcap school. 1697

Lama Rinpochhe Ye-*r*gyam of Mon arrived at *H*bras-*s*puñ. Chhu *b*ssañ Rinpochhe became abbot of *B*tsan Dgon monastery. *B*tsan-po Nomen khan died. 1698

*H*jam *d*vyañs *b*shad *r*dor became abbot of *S*go-mañ. 1699

Don-yo*d* *r*gya-*m*tsho became hierarch *D*gah *l*dan.

*S*tag-luñ shab*s* druñ Chho*s* kyi Ñima became abbot of *D*gon-luñ. 1700

Talai Lama Tshañ *d*vyañs *r*gya-*m*tsho renounced the vows of celibacy and monkhood at *B*kra śis lhunpo. 1701

The *S*de-sri*d* (viceroy) Sañs *r*gyas *r*gya-*m*tsho resigned his office. The Mongol prince Lha-*b*ssañ became king of Tibet. 1702

Sumpa *m*khanpo was born. 1703

Pa*d d*kar *h*dsin-pa was identified as the real incarnation of the Talai Lama. Lha-*b*ssañ, the son of Rahá *r*gya*l*-po, fought with the *S*de-sri*d* (viceroy) Sañs *r*gyas *r*gya-*m*tsho. The latter was killed, and with him four hundred Tibetans were slain. Lha-*b*ssañ declared himself the absolute monarch of Tibet. The Talai Lama Tshañ-*d*vyañs *r*gya-*m*tsho was ordered to China. He died near lake Khokonur. 1704

Pa*d d*kar *h*dsin-pa Yeśes *r*gya-*m*tsho was placed on the throne of Potala. 1706

The Talai Lama *S*ka*l b*ssañ *r*gya-*m*tsho was born. 1707

A great earthquake took place in Tibet. 1708

The new Talai Lama and *H*jam-*d*vyañs *b*sha*d r*dor were invested with the insignia of an imperial order. *H*jam *d*vyañs *b*sha*d*-pa founded the monastery of *B*kra śis *h*khyil in Amdo. At *D*gon-luñ the Dampa *g*súm (three incarnate Lamas) established the *R*gyu*d G*rva (Tantrik school). 1709

Chhu-*b*ssañ Rinpo-chhe, a second time, held the abbotship of *D*gon-luñ. Sumpa *m*khanpo became a monk of *D*gon-luñ. 1711

*H*jam-*d*vyañs *b*sha*d*-pa wrote the work called *H*jig-bye*d* chhos *h*byuñ. *L*chañ *s*kya Ñag *d*vañ chhos *l*dan died. 1713

*H*jam *d*vyañs *b*sha*d* pa established a Tantrik class at *B*kra śis *h*khyil, and wrote a chronology of Buddhist events. 1715

The incarnation of *L*chañskya Yeśes *b*stan-pa *S*gron-me was born.

The armies of Chuñgar, or the left branch of the Mongols, slew king Lha-*b*ssañ. 1716

The Chuñgar armies sacked the *R*ñiñ monasteries of *R*nam *r*gya*l g*liñ, *R*dorje brag, *S*min gro*l g*liñ, &c., and made the *D*ge-lugs-pa church predominant all over Tibet. 1717

Under the command of the emperor of China the Talai Lama *B*ka*l*-*b*ssañ *r*gya-*m*tsho was brought to Tibet from *S*ku-*h*bun by Thu-*b*kwan Rinpo-chhe chhos *r*gya-*m*tsho and placed on the throne of Potala.

*H*byin *r*gan became abbot of *B*kra śis *h*khyi*l*. *H*jam-*d*vyañs *b*sha*d r*dor died. The emperor Khañg-shi died. The third of the Manchu line, called Shiñ-tsu yuñ-ting, became emperor. 1721

The Oeloth Mongols of Khokonur fought with the imperial forces and were defeated. The Chinese killed upwards of seven hundred monks of all classes, including the abbot of Gser khog *d*gon, called Chhu-*b*ssañ rinpochhe, and destroyed many religious objects, and burnt down several shrines and congregation halls. They also demolished three great monasteries of Shva-vo khog as well as many hermitages. Many aged monks of *S*ku-*h*bum were also killed. Sumpa *m*khanpo proceeded to Tibet. 1722

The Chinese, under their generals Kûng and Yo-u the-ü, destroyed the temples and grand congregation halls of the *D*gon-luñ monastery, and burnt thirteen sets of *B*ka*h*-*h*gyur, and killed many monks. The monasteries of the *H*ju-lag Sem-ñi *d*gon schools, recluses cells, &c., were destroyed by them. In the autumn the three hermitages of *D*gon-luñ and Shva-vo khog, and the monasteries of *H*ju-lag were rebuilt. 1723

Sumpa *m*khanpa was appointed abbot of *S*go mañ. 1725

The nineteenth Kulika *R*nam-*g*non señ (Vikrama Siṃha) became emperor of S'ambhala. When the demon like ministers (*B*ka*h* *b*lon) killed the viceroy (*S*de-sri*d*) Shañ khañ chhenpo who was a devout advocate of Buddhism, Phola Theje *B*so*d* nam*s* *S*tob*s* *r*gya*s* (king Mivañ) returned to *D*vus from upper Tibet with troops of Ladag, *M*ña*h*ri, and *G*tsañ. He slew upwards of one thousand troops of *D*vus and Koñ-po, &c., and entirely suppressed the enemies of the Government. 1726

When the *D*vus people rose in rebellion, Phola Theje, being reinforced by the Chinese troops, killed the three rebel ministers and removed the Talai Lama to *H*ka*h*-da*g*. *R*gya*l* *s*re*s* *s*prul *s*ku became abbot of *H*bra*s* *s*puñ *B*lo-*g*sa*l* *g*liñ. Phola Theje became viceroy of Tibet, and was also invested with the title of Chun-vañ. 1727

*D*gon luñ, *B*tsan *d*gon and other monasteries having been restored to their former condition, the author's predecessor Sum-pa chho*s* *r*je Phun-tsho*g*s *r*nam *r*gya*l* and *R*bu-chho*s* *r*je *B*lo-*b*ssañ *d*pa*l* became abbots of *D*gon luñ and *B*tsan-*d*gon respectively. 1728

The author (Sumpa *m*khanpo) returned to Amdo from *D*vus in Tibet. 1730

The author founded the monastery of *B*sha*d* *s*grub *g*liñ. 1732

The author accepted the abbotship of *B*sam-*g*tan *g*liñ. 1733

Vañ chho*s* *r*je-grag*s*-pa *d*pa*l* *h*byor became abbot of *D*gon luñ.

At the command of the emperor of China the *L*chañskya

Rinpo-chhe brought back the Talai Lama from *Hgah* dag to *Dvus*, and restored peace and prosperity to Tibet and Khams. *Lchañ skya* Rinpo-chhe became famous for his excellent exposition of the work called *Rtan-hbrel stod*-pa. 1734

Emperor Yung-ting died and was succeeded by his son Chhin-lung. 1735

The incarnate Tha-kwan of *Dgon*-luñ, named *Blo-bssañ* chhos kyi Ñima, was born. At the command of the emperor the author proceeded to China. Ñag *dvañ rnam rgyal*, also called Khyuñ tsha shabs druñ, became abbot of *Dgon*-luñ. 1736

A great earthquake took place at the walled city of Ñiñ-śa *mkhar*, near the mountain called *Glañ*-ru, and destroyed the city. 1737

Panchhen *Blo-bssañ* yeśes died. 1738

The sixth incarnate Panchhen *Dpal ldan* yeśes was born. *Bde-rgyu* shabs druñ (*Dge*-legs *rgyal mtshan*) held the abbotship of *Dgon* luñ.

*Rgyal* sras ye grags died. 1739

*Blo-bssañ dpal, ldan* the incarnation of *Rgyal sras*, was born. 1740

*Rgyal* tig Rab-*hbyams*-pa (*Blo-bssañ* don-grub) became abbot of *Dgon*-luñ. 1741

A very long comet was observed in Tibet. 1742

The author (Yeśes *Dpal hbyor*), in the forty-third year of his age, was called upon to fill the abbotship of the *Dgon*-luñ monastery. 1745

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*Inscribed Seal of Kumára Gupta.*—*By* V. A. Smith, Esq., C. S.

(With a Plate.)

The first announcement of the discovery of the seal, which forms the subject of this paper, was made by an article entitled "An Archæological Find" in the *Pioneer* newspaper of the 13th May, 1889. The article attracted my attention, and I published certain remarks on it in the issue of the same newspaper for the 28th May, 1889. A few days later Mr. G. J. Nicholls, C. S., Judge of Cawnpore, entered into correspondence with me, and informed me that he was the owner of the seal. He has very kindly allowed me to examine and describe the original.

The seal (see Plate VI) is oval in shape, slightly pointed at each end, and is $5\frac{3}{4}$ inches long by $4\frac{1}{2}$ wide. The edge varies slightly in thickness, but is generally about $\frac{3}{8}$ths of an inch thick. The surface is protected by the rim being raised above the face of the plate about $\frac{1}{16}$th of an inch. The metal is whitish grey, and is thought by Mr. Nicholls to be base silver. The back of the plate is fitted with two solid buttons, each more than half an inch in diameter, by which it could be attached to another object. It probably was attached to an inscription engraved on metal.

The upper section of the face of the seal, being slightly less than one half of the surface, is occupied by a quaint figure of the mythical monster Garuḍa, executed in tolerably high relief. He is represented standing on a base composed of two parallel lines, facing front, with outspread wings. His face is that of a man, broad and full, with thick lips. His hair is arranged exactly like the wig of an English Judge. A snake is twined round his neck, its head projecting above his left shoulder.

A circle, intended doubtless for the discus of Vishṇu, who rides on Garuḍa, is faintly indicated in the field to the proper right of the figure, and a corresponding dim mark on the proper left is probably intended for the conch shell of the god.

A space an inch in length is left blank at the bottom of the plate. The interval between this space and the parallel lines on which Garuḍa stands is occupied with eight lines of prose inscription. The alphabet is that used by the Gupta kings both for coin legends and inscriptions on stone in Northern India. The letters, though minute, are well and clearly cut in moderately high relief, the vowel marks being fully expressed. Most of the inscription is easily legible, but it is damaged in places, especially in the middle of the second and third lines.

The seal was presented to Mr. Nicholls (who accepted it on behalf of Government) by a member of a very old and respectable Muhammadan family residing at Bhitarí near Sayyidpur in the Gházípur District, N. W. P. It was found at some date previous to 1886, when the foundations for a new building were being dug. It is certainly genuine.

The fact that the tablet is a seal is readily proved by comparison of it with similar objects.

The only other known seal of the Early or Imperial Gupta Dynasty is that which is fused on to the spurious copper plate grant from Gayá, purporting to have been made by Samudragupta. That seal is of copper, and is described as follows by Mr. Fleet:—"On to the proper right side of the plate, there is fused a seal, oval in shape, about $2\frac{7}{8}''$ by $3\frac{3}{8}''$. It has, in relief on a countersunk surface—at the top, Garuḍa, represented

as a bird, standing to the front, with outstretched wings; and, below this, a legend in five lines, which, being also in relief, is so worn that nothing of it can be read except a few disconnected letters here and there, and *Sam*[*u*]*drag*[*u*]*p*[*taḥ*], very faintly, at the end of line 5. It must have contained a succinct recital of the genealogy, after the fashion of the Aśírgaḍh seal of Śarvavarman, No. 47 above, page 219, and the Sonpat seal of Harshavardhana, No. 52 above, page 231 ..... The legend on the seal of this grant is in characters which present a very different appearance to those of the body of the inscription; as also does the copper of the seal, as compared with the substance of the plate; and the seal is in all probability a genuine one of Samudragupta, detached from some other plate."*

The copper seal of Harshavardhana, above referred to, is even larger than the one now under examination, measuring $5\frac{7}{8}''$ by $6\frac{7}{8}$. It weighs three pounds six ounces. "All round it there runs a rim, about $\frac{1}{4}''$ broad; and inside this there are, in rather shallow relief on a slightly countersunk surface,—at the top, a bull, recumbent to the proper right; and below this the inscription,"† in thirteen lines.

The Garuḍa device recurs on the seal of the copper plate inscription of Rája Tívara Deva (*circa* A. D. 800), found at Rájim in the Central Provinces. "The top of the seal is circular, about $3\frac{3}{16}''$ in diameter. It has, in relief on a rather deep countersunk surface, across the centre, a legend, in two lines; ..... in the upper part a figure of Garuḍa, facing full front, depicted with the head of a man, and the body of a bird, with his wings expanded, with, apparently, human arms hanging down between the wings and the feet, and with a serpent with expanded hood, standing up in front of and over each shoulder; on the proper right of this, a *chakra* or discus, the emblem of Vishṇu; and on the proper left a *śaṅkha* or conch shell; in the lower part, a floral device."‡

The device on the upper portion of a royal seal was invariably the emblem used by the dynasty concerned as its special cognizance. The seal under discussion and the Gayá one of Samudra Gupta settle definitely that the image of Garuḍa was the family cognizance of the Early Guptas, and so explain the phrase *Garumad-anka* in the posthumous inscription of Samudra Gupta at Allahabad, the bird-headed standard of the Gupta gold coins, and the reverse device of the copper coins. No doubt can now be felt that in all these cases the mythological significance of the bird-like figure is the monster Garuḍa, the vehicle of Vishṇu. The

* Fleet, *Corpus Inscriptionum Indicarum*, Vol. III, p. 255.
† Fleet, *ibid.*, Vol. III, p. 231.
‡ Fleet, *ibid.*, Vol. III, p. 292.

form of the Garuḍa-headed standard on the gold coins was, I am confident, borrowed from the Roman eagle, and the form of the device of the copper coins may have been imitated from a Greek original, that is to say, from the owl of Athene, especially as represented on coins of Pergamon.*

Sometimes Garuḍa is represented with human arms, as on the Rájim seal, and sometimes without them, as on the seal of Kumáragupta. The same variation of detail is observable in the case of the copper coins.†

The inscription on Kumáragupta's seals, is, as usual with seal legends, purely genealogical; and the greater part of the record gives the particulars of the Gupta genealogy in the standard form of words employed in the Bhitarí pillar inscription and other Gupta inscriptions.‡

In the beginning the seal omits, between the words *apratirathasya* and *mahárája-s'rí-Gupta*, a string of epithets given in the pillar inscription, but, from the words *mahárája-s'rí-Gupta* down to the name of Kumáragupta in the fifth line, the record is identical (except by omitting Kumára's title of *paramabhágavato*), word for word, with that incised on the Bhitarí pillar. The rest of the newly discovered inscription does not seem to be quite identical with the wording of any known record. A son of Kumáragupta is certainly mentioned, and the name of Kumára's queen, Anattadeví (?), is stated, but I am doubtful whether the name Skanda occurs or not. I can read only partially the 6th and 7th lines. The first four characters of the concluding 8th line are indistinct, but the remainder is easily legible, and shows that the seal belongs to the reign of Kumáragupta, *circa* A. D. 414—452.§

The antiquities at Bhitarí, near Sayyidpur at the eastern extremity of the Gházípur District in the North-Western Provinces, about half way between Benares and Gházípur, have long been known to archæologists. The site was carefully explored more than fifty years ago by Sir Alexander Cunningham and his friend Mr. Vincent Tregear. The latter became the possessor of a valuable collections of coins, many of which are now in the Bodleian cabinet.

The most notable relic is the monolith pillar bearing an inscription of the reign of Skandagupta. A translation of this record, made from Sir A. Cunningham's copy, was published by Dr. Mill in the Journal of this Society in 1837. Certain minor corrections in this translation were

* Smith, *Coinage of the Early Gupta Dynasty* in the Journal of the Royal Asiatic Society, for Jan. 1889, p. 24; see also Fleet, *ibid.*, Vol. III, p. 14, note 3.

† Smith, *ibid.*, Plate IV, figures 8—15.

‡ Fleet, *ibid.*, Vol. III, p. 53, etc.

§ Smith, *ibid.*, p. 6.

subsequently made, but the inscription was never edited properly until it came into the hands of Mr. Fleet. That scholar has now published (No. 13 in volume III of the *Corpus Inscriptionum Indicarum*) an accurate facsimile, transliteration, and translation of the document, which I have made use of in writing the above notes.

"The inscription," observes Mr. Fleet, "is one of the Early Gupta king Skanda Gupta. It is not dated. It belongs to the Vaishṇava form of religion; and the object of it is to record the installation of an image of the god Vishṇu, under the name of Śárṅgin or 'the wielder of the bow of horn named Śárṅga,' and the allotment, to the idol, of the village, not mentioned by name, in which the column stands."*

The site is marked by large brick mounds, and numerous bricks inscribed with the name of Śrí Kumáragupta were found in the fields by Sir A. Cunningham, who also describes certain sculptures which seem to belong to the Gupta period.

The presence of Indo-Sassanian coins of the 8th or 9th century A. D. is an indication that the site continued to be occupied after the fall of the Gupta dynasty.†

There can be no doubt that it was a place of importance in the reigns of Kumáragupta and Skandagupta, *circa* A. D. 414—480.

*Remarks on the above.* (*With a chronological table*).—
*By* Dr. A. F. Rudolf Hoernle.

The seal is a far more important one than would appear from Mr. Smith's statement of its contents. The fact is that it is not a seal of Kumára Gupta I., but of a Kumára Gupta II.; and that we have in the inscription of the seal, for the first time, a genealogy of the Early Gupta dynasty that enumerates nine generations, instead of only the seven hitherto known.

The last three lines of the inscription which Mr. Smith failed to read really contain the most important portion of the record, and contain entirely new information. Nor are these lines more doubtful to read than any of the preceding ones; and most fortunately the names of the kings occurring in them are very fairly distinct. The following is a complete transcript of the record, in Nágarí and Roman. In the latter transcript the less legible portions are enclosed in round, and the illegible portions in straight brackets. It should be remembered, however, that on account of the stereotyped formulas employed in such records, the reading even of these portions is perfectly certain.

* See Fleet, *ibid.*, Vol. III., p. 53.

† Archæol. Survey Rep., Vol. I, pp. 96—103, Pls. XXIX, XXX.

*Nágarí Transcript.**

1. सर्व्वराजोच्छेत्तुपृथिव्यामप्रतिरथस्य महाराजश्रीगुप्तप्रपौत्रस्य महाराजश्रीघटोत्कच-
   पौत्रस्य महा-
2. राजाधिराजश्रीचन्द्रगुप्तपुत्रस्य लिच्छविदौहित्रस्य महादेव्यां कुमारदेव्यामुत्पन्नस्य
   महाराजाधिराज-
3. श्रीसमुद्रगुप्तस्य पुत्रस्तत्परिगृहीतो महादेव्यान्तदेव्यामुत्पन्नस्स्वयं चाप्रतिरथपरम-
   भाग-
4. वतो महाराजाधिराजश्रीचन्द्रगुप्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां ध्रुवदेव्या-
   मुत्पन्नो महारा-
5. जाधिराजश्रीकुमारगुप्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यामनन्तदेव्यामुत्पन्नो महा-
   रा-
6. जाधिराजश्रीपुरगुप्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां श्रीवत्सदेव्यामुत्पन्नो महा-
7. राजाधिराजश्रीनरसिंहगुप्तस्य पुत्रस्तत्पादानुद्ध्यातो महादेव्यां श्रीमतीदे-
8. व्यामुत्पन्नपरमभागवतो महाराजाधिराजश्रीकुमारगुप्तः ॥

*Roman Transcript.*†

1. [Sar](vva)-rájochchhettuḥ pṛithivyám aprathirathasya Mahá(rá-
   ja-Śrí-**Gupta**-prapauttra)sya Mahárája-Śrí-**Ghaṭotkacha**-
   pauttrasya Ma(há)-
2. [rájá]dhirája-Śrí-**Chandragupta**-puttrasya (Lichchha)[vi-dau-
   hittra](sya Mahádevyám) [Kumá]ra-devyám utpannasya
   Mahárájádhirája-
3. [Śrí]-(**Sa**)**mudraguptasya** puttras (tat-parigṛihíto Ma)[háde-
   vyán Da](tta-devyá)m utpannas svayaṃ ch('á)pratirathaḥ
   paramabhága-
4. [vato Mahá]rájádhirája-Śrí-**Chan**(**dragup**)[**tas** ta]sya pu[ttras
   tat]-(pádánuddhyáto) Mahádevyá[ṃ] Dhruva-devyám utpan-
   no Ma(hárá)-
5. [jádhi]rája-Śrí-**Kumárag**[**u**]**ptas** tasya pu(ttra)s tat-pádánud-
   dhyáto Mahád(e)vyám Ananta-devyám utpanno Ma(há)[rá]-
6. [já](dhirája)-Śrí-**Purag**[**u**]**p**[**ta**]**s** tasya pu(ttra)s tat-pádánud-
   dhyáto Mahádevyáṃ Śríva(tsa)-devyám utpann(o) Ma[há]-
7. (rájádhirája-Śrí-**Na**)**ras**(**iṃ**)**haguptas** tasya (pu)ttras (tat-pá-
   dánuddhyáto Mahádevyáṃ Śrímatí-de)-
8. v[yá]m u(tpannaḥ parama-bhá)gavat(o) Mahárá(jádhirája-
   Śrí-**Kumáragu**)[**ptaḥ**].

* From the original seal; see Plate VI.

† The portions enclosed within straight brackets are entirely rubbed away; those within round brackets are more or less damaged, but sufficiently legible. The *upadhmáníya* is represented by *ḥ*.

*Translation.**

(Lines 1 and 2.)—The son of the Mahárájádhirája, the glorious **Samudra-Gupta,** who was the exterminator of all kings; who had no antagonist (*of equal power*) in the world; who was the son of the son's son of the Mahárája the illustrious **Gupta**; who was the son's son of the Mahárája, the illustrious **Ghoṭotkacha**; (*and*) who was the son of the Mahárájádhirája, the glorious **Chandragupta** (I.), (*and*) the daughter's son of Lichchhavi, begotten on the Mahádeví KUMÁRADEVÍ,

(Line 3.)—(*was*) the most devout worshipper of the Divine One, the Mahárájádhirája, the glorious **Chandragupta** (II.), who was accepted by him (*i. e., Samudragupta*); who was begotten on the Mahádeví DATTADEVÍ; and who was himself without an antagonist (*of equal power*).†

(Line 4.)—His son (*was*) the Mahárájádhirája, the glorious **Kumáragupta** (I.), who meditated on his feet, (*and*) who was begotten on the Mahádeví DHRUVADEVÍ.

(Line 5.)—His son (*was*) the Mahárájádhirája, the glorious **Puragupta**, who meditated on his feet, (*and*) who was begotten on the Mahádeví ANANTADEVÍ.

(Line 6.)—His son (*was*) the Mahárájádhirája, the glorious **Narasiṃhagupta,** who meditated on his feet, (*and*) who was begotten on the Mahádeví S'RÍVATSADEVÍ.

(Lines 7 and 8.)—His son (*was*) the most devout worshipper of the Divine One, the Mahárájádhirája, the glorious **Kumáragupta** (II.), who meditated on his feet, (*and*) who was begotten on the Mahádeví S'RÍMATÍDEVÍ.

All the names of the kings are quite legible on the original seal: quite sufficiently so, to identify them satisfactorily.‡ Of the names of the two last queens, *S'rívatsa* and *S'rímatí*, the two first syllables respectively (*S'ríva* and *S'ríma*) are legible; but the terminal ones (*tsa* and *tí*) can only be faintly seen.

Before discussing the information of this record, some of its techni-

* I follow Mr. Fleet's translation (*Corpus Inscriptionum Indicarum*, Vol. III, p. 54) as far as it goes.

† Or, "who was himself an antagonist (*of equal power to all his enemies*)," if we read *svayaṃ cha pratirathaḥ*; see below.

‡ The photographic plate unfortunately is not quite as distinct, as one would wish. The original plate requires to be held in various lights, and to be examined with a large magnifying glass; but with these helps there is really not much difficulty in reading the whole of the record, with the exception of those small and unimportant portions (in straight brackets) that are entirely rubbed away (apparently during the process of cleaning the plate.)

calities may be briefly noted. Firstly, the uniform use of the *upadhmániya*, in l. 1, *rájochchhettuḥ pṛithivyám*; l. 3, *apratirathaḥ parama°*; l. 8, *utpannaḥ parama°*; and secondly, of the doubling of *t* and *dh* when followed by *r* and *y* respectively, as in l. 1, *prapauttrasya* and *pauttrassya*; l. 2, *puttrasya* and *dauhittrasya*; l. 3, 4, 5, 6, 7, *puttras*; l. 4, 5, 6, 7, *pádánuddhyáto*; thirdly, the assimilation of the visarga to a following *s*, in l. 3, *utpannas-svayaṃ*; fourthly, the reading *svayaṃ ch'ápratirathaḥ* in l. 3. The same phrase is read by Mr. Fleet* in the Bhitarí stone inscription (l. 4) *svayam apratirathasya*. The phrase also occurs in Kumáragupta I.'s Bilsaḍ stone inscription and in Skandagupta's Bihár stone inscription* but in the former it is illegible, and in the latter it is cut away and lost. There are, therefore, only two records (the seal and the stone of Bhitarí) to establish the reading; and the exact point is whether the *akshara* that follows *svaya* should be read *ma* or *cha*. Now in the Bhitarí stone inscription (at least, as shown in Mr. Fleet's plate) the *akshara* is too indistinct to be definitely identified; while on the Bhitarí seal it is quite distinctly *cha*. Moreover the seal has a distinct *anuswára* over the *ya* of *svaya*, which *anuswára* is apparently also present on the Bhitarí stone; and the *anuswára* only agrees with the reading *cha* or rather *chá*. The vowel mark over *cha* is hardly distinguishable in the present state of the seal; and the reading *cha pratirathaḥ* would also give sense, but a sense not quite so suitable to the context (see the translation, above). It is preferable, therefore, to read *svayaṃ ch'ápratirathaḥ*.

The record gives the names of nine kings, *viz.*, 1, Gupta, 2, Ghaṭotkacha, 3, Chandragupta I., 4, Samudragupta, 5, Chandragupta II., 6, Kumáragupta I., 7, Puragupta, 8, Narasiṃhagupta, and 9, Kumáragupta II.; and it states distinctly that each of these kings stood in the relation of son to the preceding one. It further gives the names of six queens, *viz.*, 1, Kumáradeví, the wife of Chandragupta I. and mother of Samudragupta; 2, Dattadeví, the wife of Samudragupta and mother of Chandragupta II.; 3, Dhruvadeví, the wife of Chandragupta II. and mother of Kumáragupta I.; 4, Anantadeví, the wife of Kumáragupta I. and mother of Puragupta; 5, Śrívatsadeví, the wife of Puragupta and mother of Narasiṃhagupta; and 6, Śrímatídeví, the wife of Narasiṃhagupta and mother of Kumáragupta II.

The two longest genealogies of the Early Guptas, hitherto known, are those on two stone pillar inscriptions, both of Skandagupta,† one at Bhitarí, the other at Bihár. That at Bihár is greatly mutilated and

* *Corpus Inscriptionum Indicarum*, Vol. III, p. 53; also pp. 43, 50.

† They are given by Fleet in *Corpus Inscriptionum Indicarum*, Vol. III, pp. 47 and 52.

of subordinate value. They mention only the following seven kings: 1, Gupta, 2, Ghaṭotkacha, 3, Chandragupta I., 4, Samudragupta, 5, Chandragupta II., 6, Kumáragupta, 7, Skandagupta. Here again each king is expressly stated to have been the son of his predecessor. They further name the following three queens: 1, Kumáradeví, wife of Chandragupta I. and mother of Samudragupta; 2, Dattadeví, wife of Samudragupta and mother of Chandragupta II.; 3, Dhruvadeví, wife of Chandragupta II. and mother of Kumáragupta I.

In the main these two records agree with that of the seal; and this proves that the seal is that of a member of the great Early (or Imperial) Gupta family. This is shown also by the use of the imperial title *Mahárájádhirája*. But there are two important differences. The first is that the seal calls the seventh member of the line Puragupta, while the other two records call him Skandagupta. The second is that the seal carries the line down to the ninth generation, to another Kumáragupta, and traces it through Puragupta, instead of through Skandagupta. This proves two things: 1, that the Early Gupta dynasty did not terminate, as it has been hitherto believed, with Skandagupta, but that it lasted for, at least, two generations longer (*i. e.*, down to about 550 A. D.); and secondly that there was a second Kumáragupta among the Early Guptas. The latter discovery may possibly necessitate a reconsideration of all those chronological and other speculations which were based on the (hitherto uncontradicted) belief, that there was but *one* Kumáragupta in the dynasty.

The chief difficulty is that with respect to the relation of Puragupta to Skandagupta. Are they but different names of the same person, or was one the (younger) brother of the other?

One point may be noted with regard to these two kings. The inscription on the seal states that Puragupta's mother, and, therefore, Kumáragupta I.'s queen, was named Anantadeví. The two stone inscriptions do not name Skandagupta's mother or Kumáragupta's queen, though they speak of her. In the Bhitarí inscription it is related, how Skanda restored the imperial power of the Guptas, which appears to have suffered a serious reverse during his father Kumáragupta's time; and how he afterwards visited his mother to report to her his victories; but the mother is not named. In the Bihár inscription, it is stated that Kumáragupta married the sister of some person, whose name, however, as well as that of his sister are unfortunately lost in the mutilated record. But from a subsequent equally fragmentary portion of the record (see l. 13 in Fleet's transcript) it would seem that the brother's name may have been *Anantasena*. In that case, his sister would probably have been named *Anantadeví*; and this would agree with the record on the seal. In that case, further, Skandagupta and Puragupta would have had not only the same

father Kumáragupta, but also the same mother Anantadeví. It may be further noted, that while the seal names Śrívatsadeví as the queen of Puragupta, the queen of Skandagupta is nowhere either named or even mentioned. So far as his records are concerned, he might not have been married at all.

The question still remains, are Skandagupta and Puragupta the same persons, or are they brothers? It seems hardly probable that in such genealogies the same person would be called by different names. The probability, as I shall show further on, would seem to be, that Puragupta is a (younger) brother of Skandagupta, and succeeded the latter, who died without issue. There would still be a difficulty in the fact, that Skandagupta is entirely omitted from the list on the seal. But such omissions are not without precedent in lists which are rather intended to record the line of descent than the line of succession.* The term *pádánudhyáta*, however, no doubt, properly indicates Puragupta as having been the immediate successor of his father rather than a remoter successor of him after his brother Skandagupta.

The discovery of this seal solves another mystery. Among the gold coinage of the Early Guptas, certain coins have been found, bearing the name of *Nara* (or *Naragupta*) and the title *Bálāditya*.† That they belong to the proper Gupta class of coins, has never been seriously doubted; their resemblance to them is too thorough. But the difficulty was, where to place them; as no member of the Gupta family, called Nara, was known to have existed. It can hardly be doubtful *now*, to whom these Nara-coins belong. They are clearly issues of the Narasiṃhagupta of the new seal.

This, however, suggests a further consequence. Mr. Smith, in his *Coinage of the Early Gupta Dynasty*, has shown (pp. 40) that certain specimens of the Gupta coinage show an exceptionally heavy weight. Some of these coins belong to Nara (siṃhagupta); others to a king of an unknown name who has the title of *Prakáśáditya;* others again to a certain Kumáragupta. The obverse of the *Prakáśáditya* coins would (as usual) give the proper name of the king; but unfortunately in all the specimens hitherto found the name is lost. It may now be suggested

* A very curious, though not quite analogous, case of a similar omission occurs in one of the Valabhí grants (No. IX, in *Indian Antiquary*, Vol. VII, p. 66), where Guhasena's father Dharapaṭṭa is omitted, and he is placed immediately after his uncle Dhruvasena I. It is not impossible, that Dharapaṭṭa never reigned; if so, the record is one of the line of succession rather than of the line of descent.

† Mr. Smith denies the occurrence of *Gupta;* see his *Coinage of the Early Gupta Dynasty*, p. 118. But see fig. 22, on Pl. XVIII of the *Ariana Antiqua*. The fact, however, whether the coins do or do not bear the word *Gupta*, does not affect the argument.

that these coins perhaps belong to Puragupta. The heavy coins of Kumáragupta, with the special title of *Kramáditya*, should probably now be ascribed to Kumáragupta II., the last of the list on the seal, and not to the Kumáragupta who is numbered the fourth in the list of the Later Gupta dynasty of Magadha.*

It is impossible to identify the Kumáragupta II. of the Bhitarí seal with the Kumáragupta of the Later Guptas, although their periods probably coincide. For all the other names do not agree. The later Kumáragupta was the fourth of his line and was preceded by three princes, *viz.*, Krishṇagupta, Harshagupta, and Jívitagupta I., standing in the relation of father to son. It would, then, be necessary to assume that Jívitagupta I., Harshagupta and Krishṇagupta were identical respectively with Narasiṁhagupta, Puragupta and Kumágupta I., which is clearly inadmissible. Or supposing Krishṇagupta to have immediately followed Skandagupta of the early dynasty, and even assuming Puragupta and Narasiṁhagupta to be identical with Krishṇagupta and Harshagupta, there would Jívitagupta still remain to be accounted for, and the Kumáragupta II. of the seal would fall one generation earlier than the Kumáragupta of the later dynasty. Further, the Kumáragupta II. of the seal bears the well-known imperial titles equally with his predecessors of the early dynasty; while the Kumáragupta of the later dynasty, as shown in the Aphsaḍ stone inscription,† lays, equally with his predecessors, no claim even to the subordinate title of Mahárája. They designate themselves merely *nṛipa* or *bhúpati*. It was only the fourth of Kumára's successors, Ádityasena (preceded by Dámodaragupta, Mahásenagupta and Mádhavagupta), who was the first to lay again claim to the imperial title of Mahárájádhirája.‡ The seal, thus, decides a hitherto open question and proves that the Later Guptas of Magadha were not direct descendants of the Early Guptas. For the first three members of the Later Gupta line, Krishṇa, Harsha and Jívita I., must practically have been contemporaries of the three last members of the Early Gupta line, Pura, Narasiṁha and Kumára II. And as Narasiṁha Bálāditya is also called a king of Magadha (*e. g.*, by Hiuen Tsiang, see below), it is clear that Krishṇa and his immediate successors can only have been small princes or chiefs in Magadha, by the side of their imperial relatives. Similar remarks apply to the Later Guptas of Eastern Málava, Budhagupta and Bhánugupta.

There are two other references to Narasiṁhagupta, under his title of Bálāditya, in two inscriptions of much later times. The first is the

* See the list in Fleet's volume III. of the *Corpus Inscr. Ind.*, p. 205.

† See *ibid.*, pp. 202, 203.

‡ See *ibid.*, p. 212.

Deo-Baraṇárk inscription of Jívitagupta II. of the Later Gupta dynasty. In this inscription Narasiṃhagupta is referred to as an emperor (*parmeśvara*) who ruled long previously. The distance in time between Jívitagupta II. and Narasiṃhagupta would be about 200 years. The second is the Sárnáth inscription of a certain king, Prakaṭáditya of Benares, of the end of the seventh century A. D. Here Narasiṃhagupta is referred to as one of Prakaṭáditya's early ancestors, and as the ruler of *Madhyadeśa* or the central portion of Northern India. This description would not be unsuitable to the ancestral portion of the dominions of the Early Guptas.

The historic truth of the new seal is also proved by the inscriptions on the copper-plate grants of the so-called Parivrájaka Mahárájas, which were all issued during "the enjoyment of sovereignty by the Gupta kings." The seal shows that the line of the Early Guptas was continued down to Kumáragupta II. The latter must be placed about A. D. 530-550, and the latest of the Parivrájaka grants is dated in A. D. 528. The earliest is dated in A. D. 475; therefore already in the reign of Puragupta (see below). They all fall within the period of the great decadence of the Gupta power; and this fact may possibly account for the circumstance, that in those grants the Guptas are simply designated by the vague term *nṛipa* 'king.' At the same time, Mr. Fleet's observation,* that "they show that ..... the Gupta dominion still continued, and the name of the Gupta kings was still recognised as a power, down to A. D. 528," is fully borne out by the new seal.

I add to these remarks, for ready reference, a synchronistic Table of the probable reigns of the Early Guptas and their contemporaries or immediate successors. The numbers within angular brackets give the known dates, derived from inscriptions and other sources. Various observations suggest themselves by this table.

For an approximate determination of the period of Puragupta and Narasiṃhagupta we have the following data. Hiuen Tsiang relates, how Mihirakula was defeated and taken prisoner by king Bálāditya of Magadha.† This reference,—there can hardly be a doubt—is to Mihirakula's final overthrow in India; for, on being released by Bálāditya, he is said to have retired to Kashmír. The credit of this great overthrow, however, is ascribed to a king Yaśodharman in one of the latter's Mandasor stone pillar inscriptions.‡ In it it is stated that, at some time previous to the setting up of the pillar, Yaśodharman had subdued and extended his dominion over countries which even the Guptas and Húṇas

* See *Corpus Inscr. Ind.*, Vol. III, p. 8.

† See Beal's *Buddhist Records of the Western World*, Vol. I, pp. 168-170.

‡ No. 33, in Fleet's *Corp. Inscr. Ind.*, Vol. III, p. 142.

had not possessed. This inscription is not dated, but its date cannot have been very different from that of another Mandasor stone inscription of Yaśodharman,* dated in A. D. 533-534, because they were both engraved by the same person Govinda. In this inscription, it is stated that Yaśodharman, who was originally only a tribal chieftain (*jinendra* or *narádhipati*), succeeded in conquering the countries around him and thus founding an empire, after which he took the name of Vishṇuvardhana and the imperial titles of *rájádhirája* and *parameśvara*. Of these two inscriptions, the latter would seem to be—if anything—the later in date. In any case Mihirakula's overthrow would fall some time previously to A. D. 533; and it may be set down in A. D. 530, or perhaps even a little earlier.† It follows, that Bálāditya, in whose reign Mihirakula's overthrow took place, must have reigned down to about A. D. 530. The circumstance, that the overthrow is ascribed to both Bálāditya and Yaśodharman, would seem to be best explained thus, that Bálāditya was, at least nominally, the paramount ruler or Emperor (*Máhárájadhirája*), and that Yaśodharman, at that time a mere 'tribal chieftain,' was one of his feudatories or lieutenants, who actually accomplished the defeat of Mihirakula, but thereupon took advantage of his great success to found an empire for himself. In fact, it was probably Yaśodharman (rather than the Húṇas) that supplanted Kumáragupta II., some time after 530 A. D., thus finally breaking up the Early Gupta empire, and building up his own empire on its ruins.

On the other hand Skandagupta's earliest recorded date is A. D. 455. From this date down to A. D. 530 there are 75 years; and for this interval we have three names Skandagupta, Puragupta and Narasiṃhagupta. The interval can be more easily filled up by two generations including three reigns, than by two generations including only two reigns; *i. e.*, by assuming that Skandagupta and Puragupta were brothers, succeeding one another and being themselves succeeded by Narasiṃhagupta. Skandagupta is known to have been still reigning in A. D. 466 or 468. He may have been succeeded by his (younger) brother Puragupta c. A. D. 470, and the latter, c. A. D. 485, by his son Narasiṃhagupta. This would give to Narasiṃhagupta the long reign of about 45

* No. 35, *ibid.*, Vol. III, p. 150.

† In these calculations I follow, in the main, Mr. Fleet's remarks, in *Corp. Inscr. Ind.*, Vol. III, pp. 10-12 (Indrod.), 146, 152. But I do not agree with his view about Vishṇuvardhana, *ibid.*, p. 151. (See Proceedings for August, 1889.) It seems to me better to accept the words, in l. 5 of the inscription, in their obvious sense that Yaśodharman is identical with Vishṇuvardhana, and to suppose that Yaśodharman assumed the title Vishṇuvardhana after (and perhaps in commemoration) of his great victory. It is most improbable that the imperial titles of *rájádhirája* and *parameśvara* should be ascribed to a mere feudatory.

years, if he was still reigning in A. D. 530. There is, however, nothing at all improbable in this supposition.

Further, Narasiṃhagupta calls himself Bálāditya on his coins. We have seen that the Bálāditya of Hiuen Tsiang's account reigned down to c. 530 A. D.; and that it is quite possible that the Narasiṃhagupta of the seal reigned down to that date. It may, therefore, be concluded as most probable that the Narasiṃhagupta of the seal is identical with the Nara Bálāditya of the coins as well as the Bálāditya of Magadha, by whom, or rather in whose reign Mihirakula was overthrown by Yaśodharman.

A curious glimpse of Narasiṃhagupta is afforded in a passing allusion, in connection with the Valabhí king Droṇasiṃha, to his suzerain power, the Early Guptas. The early Valabhí rulers, as is well known, were vassals of the Early Guptas. The third of the Valabhí line was Droṇasiṃha, a younger son of the founder of that line, Bhaṭárka Senápati. Regarding this Droṇasiṃha it is mentioned in the Valabhí genealogies that he "was anointed in the kingship by the paramount master (*parama-svamin*) in person" Mr. Fleet* has suggested that this "paramount master" was Yaśodharman, who defeated Mihirakula c. 530 A. D. Now Dhruvasena I. was reigning in 526, as shown by his inscription. Droṇasiṃha was his predecessor; and his accession must, therefore, be placed c. 520 A. D. It is not probable that Yaśodharman was already in 520 A. D. an 'emperor' whose sway extended over the Valabhís. In fact, as I have tried to show, it is more probable, that in A. D. 530 he was still a mere 'tribal chieftain' and lieutenant of the emperor Narasiṃhagupta, and that his great power only dated from that victory over Mihirakula. On the other hand, about A. D. 520, Narasiṃhagupta must have still enjoyed the imperial dignity of the Guptas; and however much it may have been shorn of its ancient splendour, it was clearly still so much recognised by the Valabhís, that Droṇasiṃha got himself "anointed" by the still existing representative of that power. It may be added that the simple reference to the *parama-svamin* or "paramount master" is more easily explainable if applied to the old accustomed suzerain power of the Guptas, than to a new emperor like Yaśodharman.

That notice about Droṇasiṃha's "being anointed by his paramount master" is a rather curious one. His two predecessors enjoyed only the title of *senápati;* he was the first of his house who bore the title of *mahárája* (equal to *mahásenápati*). The notice about his 'anointment' would seem to refer to his elevation to the higher rank of a Mahárája.

* See *Indian Antiquary*, Vol. XV, p. 187, note; also *Corpus Inscr. Ind.*, Vol. III, p. 168.

The special occasion or reason for this elevation by the paramount power we are not told. But putting together the scattered historical indications of that period, it would seem that the distinction was due to a striking recovery in the fortunes of the Imperial Gupta dynasty which was mainly brought about by the exertions of the Valabhí feudatories. The circumstances are these. There are three inscriptions at Eran in Eastern Málava,* referring themselves respectively to the times of Budhagupta, Toramáṇa and Bhánugupta. Budhagupta and Bhánugupta were mere second rate rulers of Eastern Málava; but Toramáṇa possessed Eastern Málava as a portion of his imperial dominions; and his inscription is dated in the first year of his imperial power.† It may be concluded, that in that year neither Budhagupta nor Bhánugupta possessed Eastern Málava. The dates of the inscriptions of these two Mahárájas are 484 A. D. and 510 A. D. The first year of Toramáṇa cannot well fall after 510 A. D.; for it can be shown‡ that Toramáṇa was already succeeded by his son Mihirakula c. A. D. 515, and possibly even a little earlier. Again it cannot fall before 484 A. D., because in that year there were living two princes Mátṛivishṇu and his younger brother Dhanyavishṇu, the former of whom was dead in the first year of Toramáṇa. Nor can it fall before 494 A. D., because that is the last recorded date (on his coins) of Budhagupta. It follows that not only the first year of Toramáṇa's imperial power, but also his loss of that power (so far, at least, as Eastern Málava was concerned) must fall within the period A. D. 494-510. Now this is just about the period of the Senápati Bhaṭárka, the first of the Valabhí dynasty, who must have ruled from c. 495-515 A. D. With regard to him it is expressly stated, in the Valabhí genealogical records,§ that he fought with and defeated the "Maitrakas," that is, the Mihiras (a tribal designation of the Húṇas) to whom Toramaṇa belonged. It may be concluded, therefore, that it was mainly owing to the Valabhí victories that Toramáṇa was beaten back and lost his imperial power. The immediate consequence of this success of the Valabhís would naturally have been the revival of the imperial power of the Guptas, that is, of Narasiṃhagupta who was on the throne of the Guptas at that time. The first year of Toramáṇa, say A. D. 495, would be the date of

* See Fleet, *Corp. Inscr. Ind.*, Vol. III, pp. 88, 91, 158.

† See Fleet, *ibid.*, Vol. III, p. 158. The first year, named in the inscription, is not the first year of Toramáṇa's accession to rule over the Húṇa tribe, but of his assumption of the imperial dignity *(mahárájádhirája)* after his Indian conquests. See Fleet, *ibid.*, Introd., pp. 10-12.

‡ See Fleet, *ibid.*, Vol. III, Introd., p. 12; also *Indian Antiquary*, Vol. XV, p. 252.

§ See Fleet, *ibid.*, Vol. III, p. 167.

the temporary subjection of the emperor Narasiṃhagupta, and of the assumption of the imperial dignity by Toramáṇa; and A. D. 510 may be taken as approximately the date of the liberation, by the Valabhí senápati Bhaṭárka, of Narasiṃhagupta and the resumption by the latter of the imperial crown. And I would suggest, that the subsequent elevation, by Narasiṃhagupta, of the Valabhí Droṇasiṃha, c. A. D. 520, to the rank of Mahárája, was in some way an acknowledgment of the signal service rendered by the Valabhí family to the imperial house of the Guptas. Toramáṇa must have died soon after the great reverse he suffered at the hands of the Valabhís. He was succeeded, c. A. D. 515, by his son Mihirakula, who undertook to recover his father's conquests, or, as Hiuen Tsiang puts it in his account, "to punish the rebellion" of Narasiṃhagupta. For fifteen years, as shown by the Gwalior inscription,* he was successful in his operations, till at last, c. A. D. 530, he was totally defeated by the emperor Narasiṃhagupta's great vassal Yaśodharman. According to Hiuen Tsiang, Mihirakula was taken prisoner in the battle and brought to Narasiṃhagupta. On the advice of the latter's mother, he was restored to liberty, but finding his chances in India utterly gone, he retired to Kashmír. This seems to me to have been the course of events in that troubled period of the irruption of the Húṇas into India.†

I should like to throw out another suggestion. In the list of kings of the Rájatarangiṇí, there are five reigns enumerated between Matṛigupta and Durlabha I., if we omit the fabulous king Raṇáditya with his reign of 300 years. Durlabha I.'s accession may be placed in 626 A. D., allowing a probable adjustment of 30 years in the calculations of the Rájatarangiṇí.‡ Calculating a reign at the usual average of about 18 years, we obtain for the accession of Mátṛigupta about the year 530 A. D., *i. e.*, the probable year of Mihirakula's retirement into Kashmir. I would suggest the identity of Mátṛigupta and Mihirakula. There are many points in favour of the suggestion: 1, the epochs of the two kings coincide; 2, the name Mátṛigupta means "protected by the mother," and according to Hiuen Tsiang, Mihirakula owed his life to the intercession and protection of (Narasiṃhagupta) Bálāditya's mother; the name, therefore, would fit him admirably; 3, Mátṛigupta is said to have

* See Fleet, *Corpus Inscr. Ind.*, Vol. III, p. 161.

† It may be worth noting in connection with the irruption of the Huns into India in the 5th century, that it followed, by nearly a century, their irruption into Europe. The latter is said to have begun in 375 A. D., under their leader Balamir, and it was most successful under their leader Attila, A. D. 445-453. Their power was finally broken in the great battle on the Catalaunian fields, A. D. 451; corresponding to the great victory of Yaśodharman (or Yaśovarman) in A. D. 530.

‡ See Sir A. Cunningham, *Ancient Geography of India*, p. 92; also Jacobi in *Göttingische Gelehrte Anzeigen* for 1888, No. 2, p. 70.

been a stranger to Kashmír; so was Mihirakula; he is said to have been imposed on Kashmír by a king Vikramáditya, also called Harsha, of Ujjain, who is said to have been a powerful king who subdued the whole world and destroyed the Śakas, a Mlechchha tribe. This I take to be a confused version of the fact, that during the time of Narasiṁhagupta Bálāditya, who afterwards allowed Mihirakula to proceed to Kashmír, the Húṇa (a Śaka tribe) were defeated by Yaśovarman, who afterwards made himself an "emperor." Vikramáditya was a common title in the Gupta family; Chandragupta II. and Skandagupta bore it; and the similar title Kramáditya was born by Skandagupta and Kumáragupta II. In the Rájatarangiṇí either Bálāditya or Kumáragupta II. Kramáditya is referred to by Vikramáditya; and this Vikramáditya is said to have died before Mátṛigupta's resignation of his kingdom. As Mátṛigupta is said to have resigned after a reign of about four years, and as on the assumption of his identity with Mihirakula, he became king of Kashmír about A. D. 530, Bálāditya must have died very soon after that year. According to the Rájatarangiṇí, Vikramáditya had a son, Pratápaśíla Śíláditya, who was expelled by the people of Málava, but reinstated by king Pravarasena of Kashmír. Here, again, there is a confused version of certain facts. I take this Śíláditya to be identical with the king Śíláditya of Málava, who, according to Hiuen Tsiang, had lived 60 years before his own time, and who had reigned for 50 years.* As Hiuen Tsiang was in Málava in A. D. 640, the period of Śíláditya's reign is fixed as from about A. D. 530-580. He is commonly identified with the unnamed 'monarch' who is, by Hiuen Tsiang, said to have succeeded Vikramáditya of Śrávastí; and this Vikramáditya himself is commonly identified with the Vikramáditya of Málava, above mentioned.† According to Hiuen Tsiang, Vikramáditya "lost his kingdom" and was succeeded by the unnamed "monarch", *i. e.*, by Śíláditya. I would suggest that Kumáragupta II. Kramáditya is intended by Vikramáditya, who lost his kingdom by the usurpation of Yaśodharman; and that Śíláditya is one of the surnames of Yaśodharman. The latter, in his inscription (see above) is called, at first, only a *narádhipati*, which would agree with the "monarch" of Hiuen Tsiang. The times also agree; Yaśodharman Śíláditya must have usurped the imperial dignity soon after A. D. 530. He would then have reigned about 50 years, down to about A. D. 580. Throughout the whole of his reign (compare columns 5 and 8 of the synchronistic table), he had rivals for his claim of the imperial dignity in the Maukharí Varmans, till the dignity was finally secured by Prabhákara Vardhana who had

* See Beal's *Buddhist Records of the Western World*, Vol. III, p. 261.

† See *ibidem*, Vol. I, pp. 106, 108.

the surname of Pratápaśíla. According to Hiuen Tsiang the Valabhí king Dhruvasena II. (or Dhruvapaṭa),* who became king about A. D. 625, was his nephew (*i. e.*, probably sister's son). All this agrees well enough. That Vikramáditya (*i. e.*, Kumáragupta II.) is described as "king of Śrávastí" need be no difficulty. Kumáragupta's seal was found at Bhitarí, in the Gházípur District of the N.-W. Provinces; and Śrávastí may well have been the favourite residence of that emperor. Of course, if my suggestions are accepted, the narrative in the Rájataraṅgiṇí is a confused, and even grotesque, perversion of the real facts. Śíláditya is said to have been a son of Vikramáditya; this is a confused reminiscence of the fact, that Báláditya (*i. e.*, Narasiṃhagupta) had a son Kumáragupta II. Kramáditya;—Śíláditya is said to have been expelled by the people of Málava; but it was Kumáragupta that was "expelled," *i. e.*, rebelled against by Yaśodharman (Śíláditya);—Śíláditya is called Pratápaśíla; but the latter was the surname of Śíláditya's rival, Prabhákara Vardhana;—Śíláditya Pratápaśíla is said to have been seven times subdued by the king of Kashmír; very possibly the king of Kashmír had to carry on several campaigns against both Śíláditya (Yaśodharman) and Pratápaśíla (Prabhákara Vardhana), both of whom aspired to be "emperors" or "rulers of the whole world." The Rájataraṅgiṇí's account of Mátṛigupta is still more grotesque. It makes Mátṛigupta to be a poor "poet,"† and finally resign his kingdom and retire to Benares, like a good Hindú! But it hardly needs an excuse for charging the "history" of the Rájataraṅgiṇí with grotesqueness. The utter untrustworthiness of it down to the time of the Karkoṭa dynasty (Durlabha Vardhana I.), is, I believe, now generally acknowledged. Its treatment of Mihirakula, who under that name is placed at B. C. 707,‡ and of Toramáṇa and Hiraṇyakula, is the most glaring evidence of it.

I add a sketch of what seems to me to have been the fortunes of the imperial dignity during the periods immediately before and after the Húṇa troubles. I have shown them in the synchronistic table by printing in red the names of those princes that bore the imperial title of Mahárájádhirája. From Chandragupta I. down to Kumáragupta II., c. A. D. 360-533, the imperial dignity remained with the house of the Early Guptas. Under Narasiṃhagupta, c. A. D. 495, it was disputed by the Húṇa chief Toramáṇa. About 533 A. D., under Kumáragupta II., it passed away to Yaśodharman.§ From him, it passed, for a period of four

* See *ibid.*, Vol. II, p. 267.

† Perhaps a confusion with the poet Meṇṭha (or Mátṛimeṇṭha?) who is said to have lived at his court.

‡ See Shanker P. Pandit's *Gaüdavaho*, Introd., p. lxxv.

§ Evidence of Yaśodharman's or Yaśovarman's imperial power are his coins

reigns, from c. A. D. 540 to 585, to the Maukharí dynasty, under Íśánavarman, Śarvavarman, Susthitavarman and Avantivarman. Three of these Varmans, Íśána, Śarva and Avanti, receive the imperial titles, *mahárájádhirája* or *parameśvara* in two inscriptions.* Susthita is named in an inscription of the Later Guptas without any particular title;† but if he is not identical with Avantivarman—which is quite possible —, he must, in all probability, have been a Mahárájádhirája, as the intermediate ruler between two Mahárájádhirájas (see column 8). That Susthita does not receive that title in the Gupta inscription is no objection; for neither does Íśána receive it; the inscription, being one of the Later Guptas, who were a rival family, probably denied the imperial title to the Maukharís as usurpers.‡

From the Maukharís the imperial dignity passed to the Vardhana dynasty of Ṭhanesar and Kanauj, for three reigns, under Prabhákara, Rájya and the great Harsha, from c. A. D. 585 to 648, though at some time between A. D. 613 and 634 it was disputed by the Early Chalukya king Pulikeśin II.§ After Harsha Vardhana the imperial dignity appears to have been held simultaneously in the West by the Valabhís of Gujarát (commencing with Dharasena IV., c. A. D. 645) and in the East by the Later Guptas of Magadha (commencing with Ádityasena, c. A. D. 648). In the case of the Valabhís, the assumption of the imperial dignity would seem, at first, to have been a temporary one. For after Dharasena IV., who enjoyed it from c. A. D. 645-650, it lapsed again, for about 20 years, during the two following reigns of Dhruvasena III. and Kharagraha II., neither of whom seem to have borne any imperial titles, perhaps owing to the rival emperor's, Ádityasena's, ascendancy. About A. D. 670, however, Śíláditya III. again became emperor of the West; and henceforth the imperial dignity remained with these two

with the legend of *kida* (see *Proceedings* for August, 1888). *Kida* would appear to be a tribal designation of the Húṇas.

* See Fleet, in *Corp. Inscr. Ind.*, Vol. III, pp. 218, 221.

† See *ibid.*, p. 206.

‡ It may be a question whether Yaśovarman or Yaśodharman did not himself belong to a branch of the Maukharí family of Varmans. There is nothing in Yaśodharman's inscriptions to prove that he belonged to the Málava tribes. His relation to the four imperial Maukharís requires further elucidation. If, as above suggested, he is identical with the Śíláditya, who according to Hiuen Tsiang reigned 50 years, he must have been a contemporary and rival of the four imperial Maukharís. The contemporary inscription of Asphad would certainly seem to show, that the latter did not enjoy an undisputed title to the imperial dignity.

§ He assumed the imperial title *parameśvara* after a thorough defeat of Harsha Vardhana; see *Indian Antiquary*, Vol. VII, p. 164. He had not done so before A. D. 613, nor was it after A. D. 634; see *ibid.*, Vol. VIII, p. 240.

dynasties of the Later Guptas and the Valabhís, apparently, till their respective extinction. Perhaps the coincidence of Jívita Gupta II., the last of the Later Imperial Guptas, with the Nepalese king Śiva Deva II., who assumed the imperial titles, may have a deeper significance. For it may be noted, that about A. D. 648, at the time of the disruption of Harsha's empire, the Nepalese king, Aṃsuvarman, also laid claim to the imperial dignity in the North.

The Devagupta, placed in the third column of the synchronistic table, under the Later Guptas of Málava, is mentioned in the copper-plate grant of Harshavardhana,* as having been conquered by that king's brother and predecessor, Rájyavardhana II. He cannot be the Devagupta of the Later Gupta dynasty of Magadha (2nd column), as Harshavardhana himself was a contemporary of Mádhavagupta, the grandfather of that Devagupta. Moreover it is distinctly stated in the *Harsha-charita* of Báṇa, that the prince whom Rájyavardhana conquered, was a king of Málava.†

In the seventh column of the Uchchakalpa Mahárájas it will be seen, that Śarvanátha reigned up to A. D. 533. His line, including himself, consists of six members; and the founder of the line, Oghadeva, was married to a queen Kumáradeví. Six reigns at an average of 18 years, would make Oghadeva (c. A. D. 425-445) a contemporary of Kumáragupta I. of the Early Gupta dynasty. It appears, probable, therefore, that Oghadeva's queen, Kumáradeví, was a sister or daughter of Kumáragupta I.‡

* See *Epigraphia Indica*, Part II, p. 74.

† See Sh. P. Pandit's edition of the *Gaüḍavaho*, Introd., p. cxxx.

‡ Mr. Fleet in the *Corpus Inscr. Ind.*, Introd. pp. 9, 10, suggests that the Uchchakalpa dates may have to be referred to the Kalachuri era. I do not understand how this could well be. Mr. Fleet says: "if the Uchchakalpa dates were referred to the Kalachuri era, with General Cunningham's epoch of A. D. 249-50, Śarvanátha's latest date, the year 214, would be equivalent to A. D. 463-64, or Gupta Saṃvat 144; and we should have to add on twenty-one years at the end of his known period, in order to make him the contemporary of Hastin in Gupta Saṃvat 165." But the crucial year appears to me to be not Gupta Saṃvat 165, but Gupta Saṃvat 189 (see *ibid.*, p. 110). For the joint-grant of Hastin and Śarvanátha was issued in the latter year. It follows, therefore, that we should have to add on, not twenty-one, but forty-five years; or if the epoch of the Kalachuri era be A. D. 248-49, even forty-six years. On the other hand, if the Kalachuri epoch be placed, as Mr. Fleet suggests, about 25 years later, let us say at A. D. 273-74 (*i. e.*, 248-49+25), then Śarvanátha's latest date 214 Kalachuri Saṃvat will be equivalent to 168 Gupta Saṃvat; and *in that case* we should have to add on twenty-one years, in order to make Śarvanátha contemporary with Hastin in the year 189 Gupta Saṃvat. I *assume*, that when Mr. Fleet (*ibid.*, p. 111) says: "the choice lies only between Gupta Saṃvat 189 and 201," he means, that the only two years within the known period of Hastin's rule

The question may arise whether the Kumáragupta referred to in the Mandasor stone inscription of Bandhuvarman,* may not be the Kumáragupta II. of the Bhitarí seal, rather than the Kumáragupta I., the only Gupta emperor of that name hitherto known. If it be KumáraguptaII., the three Varmans, Nara, Viśva and Bandhu, would have to be brought down nearly a century, so that Bandhuvarman would be the immediate predecessor of Yaśodharman (or Yaśovarman). I am disposed to think, however, that it is really Kumáragupta I. who is referred to in that inscription.

The metal of the seal has been tested by Dr. Scully of the Calcutta Mint. His analysis shows that it consists of

| | | |
|---|---|---|
| Copper | ... | 62.970 per cent. |
| Silver | ... | 36.225 ,, |
| Gold | ... | 0.405 ,, |
| Iron | ... | trace. |

In spite of its whitish grey colour, therefore, it is rather a copper than a silver seal.

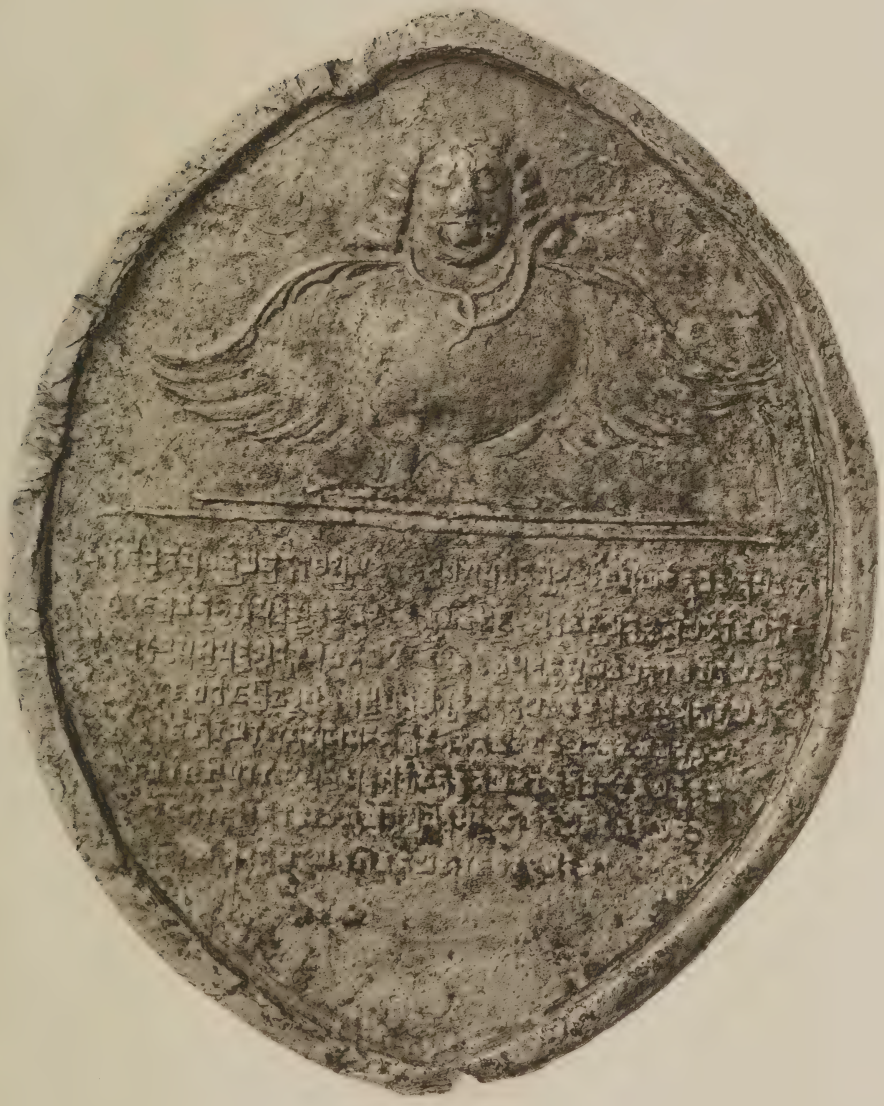
The weight and dimensions of the seal have been determined by the

(*i. e.*, between G. S. 156 and 191 or A. D. 475 and 510), with which the data of the joint-grant (*i. e.*, the 19th day of the month Kárttika, in the Mahá-Mágha Saṃvatsara) can be made to harmonise, are G. S. 189 and 201 or A. D. 508 and 520. If this is so, the date of the joint-grant is practically certain : it is either A. D. 508-9 or A. D. 520-21, whether these years be stated in terms of the Gupta Saṃvat (189 or 201) or in terms of the Kalachuri Saṃvat (260 and 272). Upon these premises, there are these two alternatives : *firstly*, if we accept the year A. D. 248-49 (or 249-50) as the Kalachuri epoch, the known period of S'arvanátha begins with Kalachuri Saṃvat 193, equivalent to A. D. 441-42, and he must have reigned not less than 67 years, to bring him down to A. D. 508 (= K. S. 260 or G. S. 189) to join Hastin in the issue of the grant ; and he must have reigned even 79 years, to bring him down to A. D. 520 (= K. S. 272 or G. S. 201), if the latter be the year of the joint-grant. Neither of these two cases will be considered admissible. *Secondly*, if, as Mr. Fleet suggests, the Kalachuri epoch be placed about 25 years later, say A. D. 473-74, the beginning of S'arvanátha's known period will be A. D. 466-67, and he must have reigned either 42 or 54 years, according as we place the joint-grant in A. D. 508 or in A. D. 520. Either of these two latter cases is possible, especially the former, requiring a rule of (at least) 42 years. But there is no real evidence whatever for the assignment of the Kalachuri epoch to the year A. D. 473-74 or thereabouts. The result is, that the probability of the Uchchakalpa grants being dated in years of the Kalachuri era appears to be *nil*. My premises may be founded on a misunderstanding ; if so, Mr Fleet will be able to explain the real facts of the case. But I thought it well to state my doubts, which may have occurred to others beside myself.

* See Fleet, in *Corpus Inscr. Ind.*, Vol. III, p. 79.

same gentleman. The weight is 10,696 grains. The measurements are :

| | | |
|---|---|---|
| Greatest length | ... | 5.74 inches. |
| Greatest breadth | ... | 4.63 „ |
| Breadth of rim | ... | 0.223 „ |
| Height of rim above surface of plate | ... | 0.11 „ |
| Thickness of seal (including rim) | ... | 0.39 „ |



COPPER-SILVER SEAL OF KUMÁRA GUPTA.

Full size.

Photo-Collotype, Survey of India Offices, Calcutta, August 1889.

# SYNCHRONISTIC TABLE OF THE REIGNS OF THE EARLY GUPTAS AND THEIR CONTEMPORARIES AND IMMEDIATE SUCCESSORS.

From the Beginning of the 4th to the end of the 8th Century, A. D.

| | 1 Early Guptas, Imperial. | 2 Later Guptas of Magadha. | 3 Later Guptas of Eastern Málava. | 4 Húna Kings. | 5 Varmans of Western Málava. | 6 Parivráj aka Mahárájas. | 7 Uchchakalpa Mahárájas. | 8 Maukhari Varmans. | 9 Vardhanas of Thánesar. | 10 Valabhís of Gujarat. | 11 Vákáṭaka Mahárájas. | 12 Mahárájas of Mahodaya. | 13 Gurjara Prince of Bharoch. | 14 Early Chálukyas. | 15 Ráshṭrakúṭas. | 16 Kings of Lichchhavis. | 17 Nepal. Thakkuris. | 18 Kings of Kashmír. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 320 | Gupta | | | | | | | | | | | | | | | Jayadeva I. | | |
| 340 | Ghaṭotkacha | | | | | | | | | | | | | | | | | |
| 345 | | | | | | | | | | | | | | | | Anonymous (*Lichchhavi*) | | |
| 360 | Chandra Gupta I. (*Son-in-law of Lichchhavi*) | | | | | | | | | | | | | | | | | |
| 380 | Samudra Gupta | | | | | | | | | | | | | | | | | |
| 395 | Chandra Gupta II. [400—414] | | | | Nara Varman | | | | | | | | | | | | | |
| 415 | Kumára Gupta I. [415—454] | | | | Víśva Varman [424] | Devádhya | | | | | | | | | | | | |
| 425 | | | | | | | Ogha Deva [*m. Kumára Devi*] | | | | | | | | | | | |
| 435 | | | | | Bandhu Varman [437] | Prabhanjana | | | | | | | Dadda I. | | | | | |
| 445 | | | | | | | Kumára Deva | | | | | | | | | | | |
| 455 | Skanda Gupta [455—468] | | | | | Dámodara | | | | | | | Jayabhata I | | | | | |
| 460 | | | | | | | Jaya Svamin | | | | | | | | | | | |
| 470 | Pura Gupta | | | | | Hastin [475—510] | | | | | | | | | | | | |
| 475 | | Krishna Gupta (*Corp., III, 14*) | | | | | Vyághra | Hari Varman | | | | | Dadda II. [478—495] | | | | | |
| 480 | | | Budha Gupta [484—494] | | | | | | | | | | | | | | | |
| 485 | Narasimha Gupta (*Báladitya*) | | | | | | | | | | | | | | | | | |
| 490 | | | | | | | Jayanátha [498] | | | | | | | | | | | |
| 495 | | | | Toramána | | | | | | Bhaṭárka (*Senápati*) | | | | | | | | |
| 500 | | Harsha Gupta (*Contemp. Aditya Varman*) | | | | | | Áditya Varman (*Brother-in-law of Harshagupta*) | | | | | Anonymous. | Jayasiṅha | | | | |
| 505 | | | | | | | Sárvanátha [508—533] (*Contemp. Hastin*) | | | | | | | | | | | |
| 510 | | | Bhánu Gupta [510] | | | | | | | Dharasena I. | | | | | | | | |
| 515 | | | | Mihirakula (*Contemp. of Narasiṅhagupta and Yaśodharman*) | | Saṅkshobha [528] | | | | Dronasiṅha (*Contemp. Narasiṅhagupta*) | | | | | | | | |
| 520 | | Jívita Gupta I. | | | | | | Íśvara Varman | | | | | | | | | | |
| 525 | | | | | | | | | Nara Vardhana | Dhruvasena I. [526] | | | Anonymous | Ranarága | | | | |
| 530 | Kumára Gupta II. | | | (*See column 18*) | Yaśodharman (*Śíláditya, vaste of Dhruvasena II.*) [533] | | | | | | | | | | | | | Mihirakula (*retired to Kashmír*) |
| 540 | | Kumára Gupta | | | | | | Íśána Varman [554] (*Contemp. Kumára Gupta of Magadha*) | | Dharapatta | | | | | | | | |
| 545 | | | | | | | | | | Guhasena [559—567] | | | | Pulikeśin I. | | | | |
| 550 | | | | | | | | | Rájya Vardhana I. | | | | Anonymous | | | | | |
| 560 | | Dámodara Gupta (*Contemp. Sarva Varman*) | | | | | | | | | | | | | | | | |
| 565 | | | | | | | | Sárva Varman (*Contemp. Dámodara Gupta*) | | | | | | Kirtti Varman I. | | | | |
| 567 | | | | | | | | | | | | | | | | | | |
| 570 | | Mahásena Gupta (*Contemp. Áditya Varman*) | | | | | | Susthita Varman (*Contemp. Mahásena Gupta*) | Aditya Vardhana (*Brother-in-law of Mahásena Gupta*) | Dharasena II. [571—589] | | | | | | | | |
| 580 | | | | | | | | Avanti Varman (*Contemp. Prabhákara Vardhana*) | | | Vindhyaśakti | | Dadda III. | | | | | |
| 585 | | | | | | | | | Prabhákara Vardhana (*Father-in-law of Graha Varman*) | | | | | | | | | |
| 591 | | | | | | | | | | | | | | Mangaliśa | | | | |
| 595 | | | | | | | | | | Śíláditya I. [605—609] | | | | | | | | |
| 600 | (*Kings of Benares*) Báladitya II. | | Deva Gupta (*Contemp. Graha Varman and Rájya Vardhana*) | | | | | Graha Varman (*Son-in-law of Prabhákara Vardhana and contemp. Deva Gupta*) | | | | | | | Dantivarman | | | |
| 605 | | Mádhava Gupta (*Contemp. Harsha Vardhana*) | | | | | | | Rájya Vardhana II. | | Pravarasena I. | | Jayabhata II. | | | | | |
| 606 | | | | | | | | | Harsha Vardhana 606—648 (*Contemp. Pulikeśin II.*) | | | | | | | | | |
| 610 | | | | | | | | | | | | | | Pulikeśin II. (*Contemp. Harsha Vardhana and Govinda*) | | | | |
| 615 | | | | | | | | | | Kharagraha I. | | | | | | | | |
| 620 | | | | | | | | | | Dharasena III. | | | | | | S'rí Deva I. [635] | | |
| 625 | | Áditysena [672] | | | | | | | | Dhruvasena II. [629] (*Contemp. Harsha-Vardhana, nephew of Śíláditya Yaśodharman*) | | Devaśakti | Dadda IV. [628—633] (*Contemp. Harsha & Dhruvasena II.*) | | Indra I. | | Aṇáyavarman [635—650] | |
| 626 | | | | | | | | | | | | | | | | | | Durlabha Vardhana (*Prajñáditya*) |
| 630 | | | | | | | | | | | Rudrasena I. | | | | | | | |
| 640 | | | | | | | | | | Dharasena IV. [645—649] | | | | | | Dhruva Deva [653] | | |
| 650 | Báláditya III. | | | | | | | | | Dhruvasena III. [651] | | Vatsarája | Jayabhata III. | | Govinda I. (*Contemp. Pulikeśin II.*) | | Jishnugupta [653] | |
| 655 | | | | | | | | | | Kharagraha II. [656] | Prithivisheṇa | | | | | Sankara Deva | | |
| 662 | | | | | | | | | | Śíláditya III. [671] | | | | Vikramáditya I. | | | | Durlabhaka (*Pratápáditya*) |
| 665 | | | | | | | | | | | | | | | | | | |
| 670 | Prakaṭáditya | | | | | | | Bhoga Varman (*Son-in-law of Áditysena*) | | | | | | | | | | |
| 675 | | Deva Gupta (*Father-in-law of Budrasena II.*) | | | | | | | | | | Nagabhata | Dadda V. | | Karka I. | Dharma Deva | Udaya Deva | |
| 680 | | | | | | | | | | | Rudrasena II. (*Son-in-law of Deva Gupta*) | | | Vinayáditya | | | | |
| 685 | | | | | | | | | | Śíláditya IV. [691] | | | | | | | | |
| 697 | | | | | | | | | | | | | | Vijayáditya | | | | |
| 700 | | Vishṇu Gupta | | | | | | | | | | Rámabhadra | Jayabhata IV. [706—734] | | Indra II. | Mána Deva. [705—732] | Narenda Deva | |
| 705 | | | | | | | | | | | Pravarasena II. | | | | | | | |
| 712 | | | | | | | | | | | | | | | | | | Chandrapída |
| 720 | | | | | | | | | | Śíláditya V. [722] | | | | | | | S'rí Deva II. [726—748] (*Son-in-law of Bhoga Varman*) | |
| 721 | | | | | | | | | | | | | | | | Mahi Deva [733—753] | | Tárápída |
| 725 | | Jívita Gupta II. | | | | | | Yaśo Varman [733] (*Contemp. Lalitáditya*) | | | Rudrasena III. | Bhoja I. | | | Dantidurga [753] | | | Lalitáditya I. (*Contemp. Yaśo Varman*) |
| 733 | | | | | | | | | | | | | | Vikramáditya II. | | | | |
| 745 | | | | | | | | | | | Anonymous. | | | | | | | |
| 747 | | | | | | | | | | | | | | Kirtti Varman II. (*deposed by Dantidurga*) | | | | |
| 750 | | | | | | | | | | Śíláditya VI. [760] | | Mahendra Pála [760] | | | | | Jaya Deva II. [750—783] | |
| 754 | | | | | | | | | | | | | | | | Vasanta Deva [754] | | |
| 755 | | | | | | | | | | | | | | | Krishna I. | | | |
| 762 | | | | | | | | | | | | | | | | | | Kuvalayápída |
| 763 | | | | | | | | | | | | | | | | | | Lalitáditya II. |
| 765 | | | | | | | | | | Śíláditya VII. [766] | Devasena | | | | | | | |
| 770 | | | | | | | | | | | | | | | | | | Prithivyápída I. |
| 774 | | | | | | | | | | | | | | | | | | Sangrámápída II. |
| 775 | | | | | | | | | | | | Bhoja II. | | | Govinda II. | | | |
| 781 | | | | | | | | | | | | | | | | | | Jayápída |
| 790 | | | | | | | | | | | Harisheṇa. | Vináyaka Pála [794] | | | *etc.* | | | *etc.* |

Eleven anonymous kings at 25 years each, between A. D. 345 and 620.

*Notes* :—1, The names printed in red indicate the kings that bore imperial titles (*mahárájádhirája, parameśvara, paramabhaṭṭáraka*, etc.). One connecting line signifies a son or length of reign, two signify a brother, three signify a nephew, cousin, etc. A bracket signifies a generation. Bracketed numbers under the names signify known dates.

2, The information in columns 1—11, 16, 17 is based mainly on Fleet's volume III of the *Corpus Inscriptionum Indicarum* : column 10, 12—15 on the *Indian Antiquary*, also on Professor Bhandarkar's *Early History of the Dekkan* ; for column 8, see Sir A. Cunningham's *Archæological Survey Reports*, vol. XV, p. 164—166 ; for column 10, see *Corpus Inscr. Ind.*, vol. III, p. 41 ; for column 15, see *Ind. Ant.*, vol. VII, p. 72 ; for column 11, see *Ind. Ant.*, vol. XII, p. 212 ; for column 12, see *Ind. Ant.*, vol. XV, p. 110 ; for column 13, see *Ind. Ant.*, vol. XVII, p. 191.

3, Column 3, on Devagupta see *Epigraphia Indica*, for 1889, No. 11, also Shankar P. Pandit's *Gaúdavaho*, Introd., Note 1 ;—column 4, on Toramána, see Jacobi in *Göttinische Gelehrte Anzeigen*, for 1888, No. 2, ; on Yaśa Varman's date see Sir A. Cunningham's *Arch. Rep.*, vol. IX. p. 27, *Ind. Ant.*, vol. XIV, p. 68, Smith's *Coinage of the Early Guptas*, p. 136 ; I read the date as 245 Gupta Saṁvat ;—column 8, on Bhoga Varman, see *Corp. Inscr. Ind.*, vol III, Introd., p. 177, 187 ;—column 10, on Dhruvasena II., see *Ind. Ant.*, vol. XVII, p. 196 ; for other particulars see my *Remarks on the Seal of Kumára Gupta II.* in the Journal, As. Soc. Beng., for 1889.

# JOURNAL

OF THE

# ASIATIC SOCIETY OF BENGAL.

Part I.—HISTORY, LITERATURE, &c.

No. III.—1889.


## *Græco-Roman Influence on the Civilization of Ancient India.*—*By* VINCENT A. SMITH, *Bengal Civil Service.* (*With several Plates.*)

### *Section I.* INTRODUCTION.

When the wearied veterans of "the great Emathian conqueror", laden with plunder and sated with conquest, refused to cross the Hyphasis and to try the fortune of war in the valley of the Ganges, the exclusive, conservative East won a victory over the intruding, progressive West, which must have appeared to the actors on the scene as final and decisive.

But it was neither final nor decisive, for, though the obstacles opposed by hostile man and nature could stop the onward march of the Macedonian phalanx, nothing could arrest the sure and world-wide progress of the ideas and culture, which constituted the real strength of Hellas and were but rudely expressed by the disciplined array of Alexander's armies.

India has not willingly sought the treasures of foreign wisdom, and, guarded by her encircling seas and mountains, she has tried, throughout the long course of ages, to work out her own salvation. She has tried, but has not succeeded. Again and again, both before and after Alexander, the barriers have been broken through, and her children, who would

fain believe that all light comes from the east, have been compelled to admit the rays of the western sun.

In the dim mist of prehistoric ages we can discern faint indications that India, in common with all regions of Asiatic and European civilization, drew supplies from those stores of Egyptian, Assyrian and Babylonian antique lore, which were, so far as we know or probably ever can know, the ultimate sources of the knowledge which distinguishes civilized man from the savage.

The history of those long past times is lost, and, save perhaps in some faintly sketched and dubious outlines, can never be recovered.

The Indian expedition of Alexander the Great in B. C. 327—326 was, so far as our definite knowledge extends, the first occasion of close, conscious contact between East and West. The arms of the conqueror, it is true, subdued no more than a mere corner of India, and that only for a moment, but the Hellenic culture, to the diffusion of which Alexander devoted attention, as great as that bestowed by him on his material conquests, long survived his transitory empire in Asia, and, even in secluded India, made its presence felt in many and different directions.

I shall not attempt to penetrate the thick darkness which conceals the relations between India and the western world in the ages before Alexander, but propose to consider the kind and degree of post-Alexandrian influence on the ancient civilization of India, and to invite my readers' attention to an obscure and little known chapter in the ever-interesting history of Greek ideas.

The working of these ideas on Indian soil, although discernible in the fields of religion, poetry, science and philosophy, is most obvious in the domain of architecture and plastic art, and I shall devote the greater part of this essay to the consideration of Indo-Hellenic architecture and sculpture.

No Indian example in stone either of architecture or sculpture, earlier than the reign of Aśoka (*circa* B. C. 260—223), has yet been discovered, and the well-known theory of Mr. Fergusson, that the sudden introduction of the use of stone instead of wood for the purposes both of architecture and sculpture in India was the result of communication between the empire of Alexander and his successors, and that of the Mauryan dynasty of Chandra Gupta and Aśoka, is, in my opinion, certainly correct. The change from wood to stone indubitably took place, and no other explanation has ever been suggested.

I shall not, however, now discuss Mr. Fergusson's theory, but shall proceed to examine particular cases of undoubted and incontestable Hellenistic, including Roman, influence on the Indian development of the arts of architecture and sculpture.

A brief discussion of the more prominent effects of the contact between the Græco-Roman and Indian civilizations on other departments of human activity in India will follow, and will enable the reader to form a conception as a whole of the impression made by the West upon the East during a period of seven or eight centuries. That impression was not sufficiently deep to stamp Indian art, literature and science with an obviously European character, although it was much deeper than is commonly supposed.

### *Section II.* Indo-Hellenic Architecture.

The style of architecture, appropriately named Indo-Persian by Sir Alexander Cunningham, and obviously derived from that employed in the Achæmenian palaces of Susa and Persepolis, was extensively used throughout Northern and Western India for several centuries both before and after the Christian era. With this style of western, though not Hellenic, origin the history of Indian architecture begins. It would be more strictly accurate to say that with this style the history of Indian architectural decoration begins, for no buildings in it exist, and we know its character only from pillars and miniature representations in sculptured reliefs.

The pillars are characterized by "a bell-shaped lower capital, surmounted by an upper member formed of recumbent animals, back to back."* The series of examples in Northern India, of pillars more or less fully corresponding to this definition, begins with the monoliths of Aśoka (*circa* B. C. 250), and ends with the pillar of Budha Gupta at Eraṇ in the Ságar District of the Central Provinces, which bears an inscription dated in the year A. D. 485.† The caves of Western India offer examples apparently rather later, and specimens of intermediate dates have been found at Bhárhut, Buddha Gayá, Sánchi, Beḍsá, and Mathurá, as well as in the Gándhára or Yúsufzai country. But there is no evidence as yet forthcoming that Indo-Persian pillars were used structurally in Gándhára. In miniature, as architectural decorations, they were a favourite ornament in that region.

The Indo-Persian pillar underwent gradual modifications in India Proper, with which I am not at present concerned. On the north-west frontier of India, that is to say, in the western districts of the Panjáb, in the valley of the Kábul River, including Gándhára or the Yúsufzai country, and in Káshmír, it was supplanted by pillars imitated from

* Cunningham, *Archæol. Rep.*, Vol. V, p. 185. [For a convenient synopsis of specimen pillars of the Persian, Indo-Persian, Indo-Hellenic (Corinthian) and Indo-Doric styles, see *ibid.*, Plates XXVII, and XLV to L. Ed.]

† All the Gupta dates are determined in Mr. Fleet's work on the Gupta Inscriptions, *Corpus Inscrip. Indicarum*, Vol. III.

Greek models. Isolated examples of Indo-Hellenic pillars probably existed in other regions also, associated with the specimens of Hellenized sculpture which occur at Mathurá and some other localities remote from the Panjáb frontier, but, as yet, none such have been discovered, and, speaking generally, the Hydaspes or Jhelam river may be assigned as the eastern boundary of Indo-Hellenic architectural forms.

The evidence does not, to my mind, warrant the use of the term "Indo-Grecian styles of architecture," which is employed by Sir A. Cunningham. So far as I can perceive, the published plans of Indian buildings show no distinct traces of Greek ideas, and there is no evidence of the employment of the characteristic Greek pediment or entablatures. The known facts prove only that the Indians used, in buildings planned after their own fashion, pillars copied, with modifications, from Greek prototypes.

In the outlying province of Káshmír and the dependent region of the Salt Range a modified form of the Doric pillar was employed. The earliest example of the use of this form is found in the temple of the sun at Mártaṇḍ, which was erected not earlier than A. D. 400, and perhaps should be dated two or three centuries later. Temples in a style similar to that of Mártaṇḍ appear to have continued to be erected in Káshmír down to the time of the Muhammadan conquest of the valley. They are characterized by trefoiled arches, and pyramidal roofs, and were frequently, if not always, built in the centre of shallow tanks. These peculiarities are in no wise Greek. The pillars undoubtedly, as Sir A. Cunningham observes, resemble the Grecian Doric in "the great ovolo of the capital, and in the hollow flutes of the shaft." It is difficult to believe that the agreement in these respects between the Greek and Indian work is accidental, but it is also difficult to imagine the existence of a channel through which the Kashmirians borrowed the Doric form of pillar at a time when every other manifestation of Hellenic ideas had already disappeared, or was on the point of disappearing, from India.

I cannot venture to deny the Greek origin of the semi-Doric pillars of the temples in Káshmír, although I am not satisfied that it is fully established. Even if it be admitted, the admission is hardly sufficient to warrant the assertion that the Kashmirian buildings are examples of an Indo-Doric style. The most that can be correctly affirmed is, that these buildings contain pillars which may fairly be described as Indo-Doric. These Indo-Doric pillars, if there be indeed anything Doric about them, are never associated with Indo-Hellenic sculpture, or anything else which gives the slightest indication of Greek influence. The Káshmír style stands apart, and the study of it throws little light either on the history of Indian architecture, or on that of the diffusion of Greek ideas. I shall, therefore, exclude it from consideration, and

refer readers who may care for further information on the subject to the discussion of it by Mr. Fergusson and Sir A. Cunningham, and to the fine series of plates prepared under the supervision of Major Cole.*

But, whether the pillars of the Káshmír temples be really derived from Doric prototypes or not, there is no doubt whatever that pillars, the designs of which are modifications of the Ionic and Corinthian types, were common on the north-west frontier of India during the early centuries of the Christian era.

These Greek architectural forms have as yet been found only in a very limited area, which may be conveniently referred to under the name of Gándhára.†

The boundaries of the kingdom of Gándhára, as it existed in ancient times, are known with approximate accuracy. Hiuen Tsiang, who travelled between A. D. 629 and 645, describes the kingdom as extending about 166 miles (1000 *li*) from east to west, and 133 miles (800 *li*) from north to south, with the Indus as its eastern boundary. The great city of Purushapura, now known as Pesháwar, was then the capital.‡ The earlier Chinese traveller, Fa Hian (A. D. 400—405), assigns the same position to the kingdom of Gándhára, though he describes its boundaries with less particularity.§

The region referred to by both Chinese pilgrims may be described in general terms as the lower valley of the Kábul river. It is very nearly identical with the territory to the north-east of Pesháwar, now inhabited by the Afghán clan, known as the Yúsufzai or Sons of Joseph, which comprises the independent hilly districts of Swát and Buhner, as well as the plain bounded on the east by the Indus, on the north by the hills, and on the south and west respectively by the Kábul and Swát rivers. This plain, which is attached to the Pesháwar District, and administered by British officers, corresponds to the tract known to the Greeks as Peukeloaitis (Sanskrit *Pushkaláwatí*), the capital of which occupied the site of the modern Hashtnagar, eighteen miles north of Pesháwar.‖

* Major Cole's book is entitled *Illustrations of Ancient Buildings in Káshmír*, (London, India Museum, 1869). His plates are good, but his remarks on the dates of the buildings illustrated would have been better omitted. Mr. Fergusson discusses the style in his *History of Indian and Eastern Architecture*. Sir A. Cunningham described it in the Journal, Asiatic Society, Bengal, for 1848, and recurs to the subject in *Archæol. Reps.*, Vol. V, pp. 84-90, Plates XXVI, XXVII; Vol. XIV, p. 35, Pl. XV.

† Sanskrit authority warrants either a long or short vowel in the first syllable of the name.

‡ Beal, *Buddhist Records of the Western World*, Vol. I, p. 97.

§ Fa Hian, Travels, Chapter X, in either Beal's or Legge's translation.

‖ Cunningham, *Archæol. Rep.*, Vol. V, p. 1. Hashtnagar is described *ibid.*, Vol. II, p. 90, and Vol. XIX, pp. 96—110.

Strictly speaking, therefore, the name Gándhára is applicable only to a small territory west of the Indus.

But the great city of Taxila, (Takkhasilá, or Takshaśilá, the modern Sháh kí Dherí), situated three marches, or about thirty miles, east of the Indus, was undoubtedly, in the time of Alexander the Great, the chief city on the north-western frontier of India, and must have been then, as it subsequently was in the reigns of Aśoka and Kanishka, included in the dominions of the government which ruled Gándhára. Kanishka is expressly called the king of Gándhára.*

The vast Buddhist religious establishments at Mánikyála, about thirty miles south-east of Taxila, belonged to the same jurisdiction, and at both places remains are found of that Indo-Hellenic school of art, which attained its chief development in Gándhára west of the Indus. The name of Gándhára, as indicating an artistic and architectural province, may, therefore, be extended, as it was by Mr. Fergusson, so as to comprise the modern districts of Pesháwar and Ráwalpindí, including Taxila and Mánikyála, as far east as the Hydaspes or Jhelam river. When speaking of the art of Gándhára I must be understood as employing the name in its wider sense.

The upper valley of the Kábul river was full of Buddhist buildings, many of which have been explored by Masson and others, and was included in the dominions of Kanishka and his successors. But, so far as the published accounts show, this region was only slightly affected by Hellenic influences, and it must, for the present at all events, be considered as outside the artistic province of Gándhára.

The Gándhára territory, the situation of which has thus been defined, was the principal seat of Hellenic culture in India, and from one or other part of it nearly all the known examples of Indo-Hellenic art in its most characteristic forms have been obtained. Traces of Greek and Roman teaching may be detected in the remains at many localities in northern and western India, but nowhere with such distinctness as in the lower valley of the Kábul river. The Gándhára school of art obviously deserves, though it has not yet obtained, a place in the general history of Greek architecture and sculpture, and this cannot be said of the other early Indian schools.

At Bhárhut, Sánchi, Buddha Gayá, Ajaṇṭá, and Amarávatí proofs may be given that the local style of art was modified by contact with

* A full account of the ruins of Taxila will be found in Cunningham, *Archæol. Rep.*, Vol. II, pp. 112, *seqq.*; Vol. V, pp. 66, *seqq.*, and Vol. XIV, pp. 9, *seqq.* Fa Hian states that Dharma Vardhana (or Vivardhana, as Dr. Legge writes the name), son of Aśoka, ruled in Gándhára, and, according to another legend, the stúpa in memory of Aśoka's son Kunála was situated south-east of Taxila, (Cunningham, *Archæol. Rep.*, Vol. II, p. 149.)

that of the western world, but the evidence does not lie upon the surface. In the remains of the buildings and sculptures of Gándhára the merest tyro can perceive at a glance that the style of art is in the main Greek or Roman, not Indian.*

* The principal references to published notices of the Gándhára school of art are as follows ;—

(1) *Notes on some sculptures found in the District of Peshâwar.* By E. C. Bayley. With several rude lithographs. (*Journal As. Soc., Bengal,* Vol. XXI (1852), pp. 606—621). The sculptures described in this paper were collected at Jamálgaṛhí by Messrs. Lumsden and Stokes, and were destroyed by the fire at the Crystal Palace.

(2) *Indian Antiquary,* (Bombay), Vol. III, pp. 143, 159.

(3) *History of Indian and Eastern Architecture.* By James Fergusson.

(4) *Reports of the Archæological Survey of India, Vol. V.* By Sir A. Cunningham. Volume II of the same series gives information concerning Taxila. See also Vol. XIV, p. 31, Pl. XIV.

(5) *Descriptive List of the Principal Buddhist Sculptures in the Lahore Museum,* p. 11. This list, kindly supplied to me by the Curator, contains brief particulars of 95 specimens, of which 32 are marked with an asterisk, as being either "in exceptionally good preservation, or interesting from their subjects." The list is signed by Sir A. Cunningham, but is not dated. Two specimens are noted as coming from Sahri Bahlol, and one is stated to have been obtained in the fortress of Ráṇígat, but no other indication is given of the localities from which the sculptures were obtained.

I have not been able to procure a "*Memorandum by Mr. Baden-Powell on the sculptures in the Lahore Museum,*" which is referred to by Sir A. Cunningham, *Archæol. Rep.*, Vol. V, p. 55, *note* 1.

(6) *Catalogue and Handbook of the Archæological Collections in the Indian Museum.* By John Anderson, M. D., F. R. S., etc. Part I, Calcutta, 1883. 201 Indo-Hellenic objects are described, *viz.*, 177 arranged under the heading Gándhára, 18 under Pesháwar, two under Mathurá, and one each under Hazára, Kábul, miscellaneous, and Bihár.

(7) *Memorandum on Ancient Monuments in Eusufzai* (*sic*). By Major Cole ; being part of the Second Report of the Curator of Ancient Monuments in India, pp. CXIV, *seqq.* This document was separately reprinted at the Government Central Branch Press, Simla, 1883. It is illustrated by rough lithographic plates, comprising all the subjects subsequently treated by the heliogravure process, as well as by a map of the Yúsufzai country, and eleven other plans and sketches.

(8) *Preservation of National Monuments, India, Græco-Buddhist Sculptures from Yúsufzai.* By Major H. H. Cole, R. E. Published by order of the Governor-General in Council for the office of Curator of Ancient Monuments in India. Large folio, p. 7, with 30 very fine heliogravure plates, 1885.

(9) *The Buddhist Stúpas of Amarávatí and Jaggayapeta.* By James Burgess, C. I. E., etc., Archæological Survey of Southern India. Trübner, London, 1887. This work does not describe the sculptures, but some good specimens of them are figured in woodcuts Nos. 1, 4, 11, 14, 21, 23, 24, and 26, which are copied from the illustrated edition of Sir E. Arnold's *Light of Asia.*

(10) *Alt- und Neu-Indische Kunstgegenstände aus Professor Leitners jüngster*

No indication of a knowledge of the Doric order of architecture can be detected in the remains of the buildings of Gándhára. With two exceptions, the only Greek architectural form used is a modification of the Corinthian pillar and pilaster.

The two exceptions both occur to the east of the Indus, outside the limits of Gándhára proper.

On the site of Taxila Sir A. Cunningham disinterred the remains of a Buddhist temple, the portico of which was supported on four massive sandstone pillars of the Ionic order. Similar, though smaller, pillars were found in the interior of the building. No part of the larger pillars was discovered, except their bases. The mouldings of these bases are said to correspond exactly with those of the pure Attic base, as seen in the Erechtheum at Athens, the only difference being the greater projection of the fillet below the upper torus in the Indian example.

Portions of the shafts and capitals of the smaller pillars were found. The shafts are circular in section and plain. The capitals were made of nodular limestone, and appear to have been plastered and gilded. They agree generally in form with Greek, not Roman, models, but are ruder and more primitive in style, and are specially distinguished from all

*Sammlung*, ausgestellt in K. K. Österr. Museum für Kunst und Industrie, Stubenring 5. Verlag des K. K. Österr. Museum's Wien, 1883.

The specimens of the Gándhára school of art preserved in museums are very numerous. The principal collection is that in the Lahore Museum. It is very extensive, numbering many hundred objects, but seems to be badly arranged. I have not seen it. The collection next in importance is that in the Indian Museum, Calcutta. Dr. Anderson's carefully compiled Catalogue gives a good idea of its contents. Major Cole intended to send spare specimens to the museums at Bombay, Madras, and some other places, which were, I suppose, sent.

In London the best collection, though not an extensive one, is that which occupies cases Nos 1—7 in the Asiatic Saloon of the British Museum. The South Kensington collection is officially described as comprising 24 sculptures in stone, and 49 plaster casts from originals in the Lahore Museum, presented by Sir R. Egerton in 1882. When I examined the specimens in 1888, they were exhibited partly in a glass case, partly on a detached screen, and the rest on a wall screen. Dr. Leitner's collection at Woking comprises some original sculptures and a considerable number of casts from the works in the Lahore Museum. It is described in the printed Catalogue above cited.

The Museum at Vienna contains some specimens presented by Dr. Leitner, and many examples of the work of the school are believed to exist in private hands both in Europe and India. Sir A. Cunningham possesses a valuable series of photographs of the more remarkable sculptures. Mr. Kipling, Curator of the Lahore Museum, informs me that he intends to arrange for the publication of a set of photographs of Indo-Hellenic art. The specimens in the possession of Mr. L. White King, B. C. S. will be noticed subsequently.

known Greek examples by the excessive weight and height of the abacus.*

The employment of stucco to conceal the roughness of the limestone and to facilitate the execution of the moulding reminds us of the temple of Fortuna Virilis at Rome, where the same expedient was used to complete the decorative work on Ionic capitals made of rugged travertine.†

Sir A. Cunningham subsequently discovered among the ruins of Taxila in another temple the bases and portions of the drums of two Ionic pillars, differing slightly in detail from those above described.‡

These two buildings are the only known examples of the use of the Ionic form of pillar in India.

The rude style of the capitals in the building first discovered—the only ones yet found—might suggest the fancy that the Taxilan temples preserve specimens of the primitive Ionic order in its Asiatic form, before it was developed by Greek skill. But the evidence of the comparatively late date of the temple adorned by these rude capitals is too clear to allow indulgence in such a notion. The building cannot, apparently, be earlier than B. C. 20 or 30, the approximate date of king Azes, twelve of whose coins were lifted out by Sir A. Cunningham with his own hand from their undisturbed resting place below the floor of the sanctum, and under the corner of a platform which had supported a number of plaster Buddhist statues.§ The date of the temple may therefore be assigned roughly to the beginning of the Christian era, at which time, it need not be said, the Ionic order had long been fully developed. The question of date will be considered more fully in a later section.

The Taxilan temples with Ionic pillars were, like all the known examples of Indo-Hellenic architecture, dedicated to the service of the Buddhist religion. Sir A. Cunningham gives a plan of the one first discovered, from which it appears that the whole edifice was 91 feet long by 64 feet broad, standing on a platform, which projected about 15 feet beyond the walls on all sides except the east, forming a terrace adorned with plaster statues. It is supposed that this terrace was roofed in as a cloister. The entrance was on the east, in the centre of one of the larger sides, through a portico supported on four Ionic columns. This portico led into an entrance hall, $39\frac{1}{2}$ feet long from north to south, by $15\frac{3}{4}$ feet broad from east to west. The sanctum or cella of the temple lay behind this, with a length of 79 feet from north to south,

* Cunningham, *Archæol. Rep.*, Vol. II, p. 129; Vol. V, pp. 69, 190.

† Burn, *Roman Literature and Art*, p. 204.

‡ Cunningham, *Archæol. Rep.*, Vol. XIV, p. 9, Pl. VII.

§ Cunningham, *ibid.*, Vol. V, pp 72, 190.

and a breadth of 23½ feet from east to west. This room, except at the wide doorway, was surrounded by a bench 4 feet 8½ inches broad, and 2 feet high, which supported plaster statues of Buddha, with his hands either resting on his lap or raised in the attitude of teaching. It is remarkable that the hair of these figures was rendered by the conventional curls, which are so commonly associated in later times with Buddhist and Jain art. Unluckily no drawings or photographs of these plaster figures have been published, and it is impossible to say whether they were coeval with the Ionic pillars or not. I should not have expected to find plaster statues at the beginning of the Christian era, and I suspect that the images are of considerably later date than the pillars.

Sir A. Cunningham believes that the roof was constructed mainly of wood, and that the chambers were lighted by windows in the upper part of the walls, which projected above the roof of the surrounding cloister. He conjectures that the four portico pillars "must have been intended to support a vaulted roof presenting a pointed arch gable to the front, as in the smaller chapels across the Indus." A small room, 20 feet 1½ inch long by 15¾ feet broad, communicated with each end of the entrance hall.

The reader will not fail to observe that the plan and elevation of this temple have little in common with those of Greek temples.

I agree with Sir A. Cunningham and Mr. Fergusson in regarding the buildings with Ionic pillars at Taxila as the oldest architectural remains yet discovered in the Gándhára province, and I shall subsequently attempt to show that a considerable interval separates them from the numerous edifices characterized by a lavish use of Corinthian pillars and pilasters.

The fact that the Corinthian pillars and pilasters were used, much in the same way as they are in many modern European buildings, for decorative purposes applied to buildings of native design, and not as members of an "order" in the technical sense, is clearly proved by the manner in which Indo-Persian and Indo-Corinthian forms are employed together. No styles can be more diverse than these, and yet the Gándhára architects felt no scruples about employing them both in the one building, or even in the one sculpture. The first plate in Major Cole's set of beautiful heliogravures affords a good illustration of this purely decorative use of two diverse styles. The subject of the plate is an alto-rilievo of the seated Buddha embellished by numerous minor figures and architectural decorations. The latter chiefly consist of combinations of Indo-Persian pillars with plain "Buddhist railings" and ogee-shaped façades, while the pilasters at the lower corners of the slab have acanthus leaf capitals in the Indo-Corinthian style. This sculpture was probably executed in the third century A. D.

Although there is no reason to suppose that the Gándhára buildings adorned with Corinthian pillars were Greek or Roman in plan or elevation, the remains excavated, especially those at Jamálgaṛhí, prove that such pillars, both circular and square in section, were used for structural support, as well as for sculptural decoration.

No piece of Corinthian shaft has yet been discovered. The testimony of the sculptures is not conclusive, but, so far as we can judge from the miniature pillars and pilasters in the reliefs, the shafts were plain, not fluted.

The incomplete lower parts of the bases of two structural pillars have been found, and a comparison of their dimensions with those of the pillars in the famous choragic monument of Lysicrates at Athens (B. C. 334) has satisfied Sir A. Cunningham that the Indian examples differ from the Greek standard "solely in giving an inward slope to the perpendicular narrow fillet which separates the scotia and torus.

"In both the Indian examples it will also be observed that the torus, or round projecting moulding, is thickly foliated, like that of most of the Corinthian bases. Of the upper part of the base not even a fragment has yet been found; and the representations in the bas-reliefs do not offer any assistance, as they show only one large and one small torus, separated by an astragal, and altogether want the deeply marked scotia which forms the leading characteristic of the Corinthian base, and which is carefully preserved in both of the full-sized Indian specimens."

The foliation referred to is not found on the bases of the pillars of the monument of Lysicrates, and is, I think, purely Roman decoration. I shall subsequently give reasons for dating the Gándhára pillars between A. D. 250 and 350, and for holding that all the Indian buildings adorned with Corinthian pillars were constructed under the influence of Roman art. The remains of structural Indo-Corinthian capitals, found chiefly at Jamálgaṛhí and Takht-i-Bahí, are numerous, but unfortunately are never perfect, owing to the brittleness of the clay slate in which they were carved, and to the practice of constructing each capital from many pieces bound together by iron cramps. The lower portion of the larger capitals, some of which measure about three feet in diameter, was made in from two to four pieces; the upper portion always consisted of four segments.

The British Museum possesses some fine examples of these capitals collected by Sir A. Cunningham at Jamálgaṛhí, and smaller specimens may be seen in the collection at South Kensington. Others are preserved in the Indian Museum, Calcutta, and in the Lahore Museum.*

* Plates XLVII—L of Cunningham's *Archæol. Rep.*, Vol. V, are devoted to the illustration of Indo-Corinthian pillars. The restoration of elephants on the top of a

Sir A. Cunningham, who was unwilling to recognize Roman influence on the art of Gándhára, compares the Indo-Corinthian capitals with those of "the pure Corinthian order of Greece" as follows:—

"The chief points of similarity are:—

1st. The three rows of acanthus leaves, eight in each row, which are arranged round the drum or bell of the capital.

2nd. The broad, but not deep, volutes at the four corners.

3rd. The four pointed abacus with a curved recess in the middle of each side.

The most marked points of difference are the following:—

1st. The wide spread of the abacus, which is equal to $2\frac{1}{2}$ heights of the whole capital, that of the Greek examples being little more than $1\frac{1}{2}$ height.

2nd. The retention of the points at the four corners of the abacus, which in all the Greek examples have been cut off.

3rd. The insertion of a fourth row of acanthus leaves which is projected forward to the line joining the horns of the abacus. The abacus is thus formed from a square having a curved recess on each side of the central projection.

4th. The placing of flowers on the abacus which are supported on twisted stems springing from the roots of the volutes. In a single instance fabulous animals are added to the flowers on the horns of the abacus.

5th. The insertion of human figures amongst the acanthus leaves, whose overhanging tufts form canopies for the figures."

I have quoted this passage in full, not because I attach much value to the comparison made in it, but because it gives an authoritative description of the characteristic features of the Indo-Corinthian capitals. Sir A. Cunningham cannot help admitting the resemblance between those specimens which exhibit human figures among the foliage and Roman capitals found in the ruins of the baths of Caracalla, but avoids the natural conclusion, and boldly declares that, if the design for these capitals with human figures was suggested by any earlier works, "the suggestion must have come from the creative Greeks of Ariana, and not from the imitative Romans."* On the other hand, I am fully convinced, as I shall try presently to prove, that the design in question did come "from the imitative Romans," and that the art of Gándhára is essen-

capital shown in Pl. XLVIII is conjectural, and not supported by adequate evidence. Two of the Jamálgarhí capitals are figured in Fergusson's *History of Indian and Eastern Architecture*, and a rough sketch of one specimen from the same place is given in *Indian Antiquary*, Vol. III, p. 142.

* Cunningham, *Archæol. Rep.*, Vol. V, pp. 192—194.

tially Roman in style. The Jamálgaṛhí carvings date, I believe, from about the middle of the third century A. D., and can be usefully compared in detail only with the similar work in contemporary, or nearly contemporary, Roman buildings. It is waste of trouble to make elaborate comparison of their details with those of the monument of Lysicrates, which was erected about six hundred years previously, but I am not sufficiently acquainted with the minutiae of architectural criticism to pursue the subject further, and must leave to others the task of accurately verifying the various differences and resemblances between the Indo-Corinthian and Romano-Corinthian styles. Probably, however, the task would not justify the labour bestowed upon it. If the Roman origin of the Indo-Corinthian style be admitted, very minute study of variations in detail may be deemed superfluous, great variation in the embellishment of Corinthian capitals being everywhere allowed and practised.

## *Section III.*

### The Gándhára or Pesháwar School of Sculpture Described.

A specimen of sculpture, apparently Indo-Hellenic in style, and closely related to the work of the Gándhára school, was discovered at Kábul in 1833,* but the first distinct announcement of the existence of a school of Hellenic art in India was made in 1836 by James Prinsep, the founder of scientific Indian archæology, who published in that year at Calcutta a description, illustrated by rude plates, of the so-called Silenus group procured by Colonel Stacy at Mathurá. This group, though undoubtedly Indo-Hellenic in style, is not the work of the Gándhára school. It will be discussed in the next following section.

The ruins of the monastery at Jamálgaṛhí, north-east of Pesháwar, were discovered by Sir A. Cunningham in 1848, but he did not publish any account of his discovery till many years later.

The first published account of the Gándhára sculptures is that written by the late Sir E. C. Bayley, who printed in the Journal of the Asiatic Society of Bengal for the year 1852 an account, illustrated by

* *Journal Asiatic Society of Bengal*, Vol. III, p. 362, Pl. XXVI, fig. 1; Anderson's *Catalogue*, Part I, p. 261 (K. 1). The sculpture is circular, 15½ inches in diameter, and represents the seated meditating Buddha with flames proceeding from his shoulders, and surrounded by subordinate figures. It was discovered in November, 1833, in ruins two miles south-east of the city of Kábul, enclosed in a large and beautifully roofed square masonry cell, "handsomely gilt, and coloured by lapis lazuli, which is found in considerable quantities in the mines of Badakshán, twelve days' journey from Kábul." Lapis lazuli has also been found on the site of Taxila, and at Baoti Pind in the Ráwalpindí District. (Cunningham, *Archæol. Rep.*, Vol. II, pp. 117, 141).

the roughest possible sketches, of some remarkable sculptures found at Jamálgaṛhí. The works, thus imperfectly illustrated, were subsequently brought to England, and exhibited in the Crystal Palace, where they were destroyed by the disastrous fire which also consumed Major Gill's copies of the paintings on the walls and ceilings of the Ajaṇṭa caves.

Prinsep's and Bayley's description of the works of Indo-Greek sculptors failed to attract general attention, probably owing to the extreme rudeness of the illustrative plates. Dr. Leitner, who brought to Europe in 1870 a considerable collection of works of art, to which he gave the name of Græco-Buddhist, is entitled to the credit of being the first to interest the learned world in the existence of a school of Indo-Hellenic architecture and sculpture.

Though the Greek influence on the style of the works exhibited by Dr. Leitner, and on the many similar objects since discovered, is now universally admitted, it is remarkable that, so late as the year 1875, at least one writer of repute denied its existence.

"It has become a fashion recently," wrote the late Mr. W. Vaux, F. R. S., "to extend a Greek influence to districts east of Bactria, for which I venture to think there is really but little evidence. Thus, we are told that certain Buddhistic figures, chiefly in slate, procured by Dr. Leitner and others to the north-east of Pesháwar, exhibit on them manifest traces of Greek art. I am sorry to say that I cannot perceive anything of the kind."*

The Greek influence on the Gándhára sculptures, which Mr. Vaux could not perceive, is so obvious to other critics, that a formal refutation of his ill-founded scepticism would now be superfluous. Professor Curtius has rightly observed that the discoveries of Dr. Leitner, Sir A. Cunningham, and other explorers in the Kábul valley, "open a new page in the history of Greek art."†

The new page thus opened has as yet been little read, and I venture to hope that the following description of a few of the most noteworthy examples of Indo-Hellenic art, and discussion of the sources from which it was derived, may attract both classical and Oriental scholars to the further exploration of a field hitherto very imperfectly worked.

The present section will be devoted to the description of some of the more remarkable and characteristic specimens of the work of the

* *Numismatic Chronicle*, Vol XV, N. S., p. 12, *note*.

† *Abhandlung über die Griechische Kunst*, as quoted in Dr. Leitner's Catalogue. I believe the paper was published in the *Archæologische Zeitung* for 1875, but I have not seen it.

very prolific sculptors belonging to the Gándhára school. The chronology and artistic relations of the school will be separately discussed in a subsequent section; at present I shall refer only very briefly to these topics.

The oldest known example of Indo-Hellenic sculpture in the Panjáb probably is the statuette in purely Greek style of Pallas Athéné, the original of which is in the Lahore Museum. Dr. Leitner has a good cast of this work in his museum at Woking, and Sir A. Cunningham possesses a photograph of it. It is shown in Plate VII.

The attitude of the goddess is that represented on certain coins of Azes, which show her helmeted, standing, facing front, crowning herself with her right hand, and holding in her left hand a spear obliquely across her body. The goddess of the coins carries a shield also on her left arm, but the statuette is imperfect, and the shield has been lost.*

The close relation of this sculpture to the coins of Azes proves that it must be approximately contemporary with that prince, that is to say, that it dates from the beginning of the Christian era, or possibly a few years earlier. It therefore belongs to the same period as do the Ionic pillars of the Taxilan temples. The statuette is said to have been found somewhere in the Yúsufzai country, but the exact locality where it was discovered does not seem to be known.

I shall explain subsequently my reasons for thinking that this statuette of Pallas is a relic of Indo-Hellenic sculpture properly so called, as distinguished from the Indo-Roman school to which all, or almost all, the other examples of Gándhára art belong.

The effigy of the virgin goddess of Athens cannot be certainly connected with any Indian religious system, and we cannot say whether the statuette above described formed part of the decoration of a Buddhist temple or not. But in all probability it did, for every specimen of Indo-Hellenic sculpture from Gándhára, the find-spot of which is known, belonged to a Buddhist building of one sort or another.

Most of the sculptures are evidently Buddhist in subject, but some of them, notably the figures supposed to represent kings, deal with secular subjects, though used to decorate edifices consecrated to the service of religion.

* Gardner, *Catalogue of Coins of Greek Kings of Bactria and India*, Plate XVIII, 4. Cunningham, in his *Descriptive List* (No. 21), observes, "The lower right arm, which probably bore the ægis with the head of Medusa, has been lost." This remark is evidently erroneous. The goddess on the coins carries, as might be expected, the shield on her left arm, and grasps the spear with her left hand. Her right arm is raised, with the hand to her head, as for the purpose of crowning herself.

Dr. Leitner and Sir A. Cunningham both consider that the most striking piece in the extensive collection at the Lahore Museum is the figure of a throned king, resting his left foot on a footstool, and grasping a spear in his left hand. See Plate VIII. The upper part of the body is naked, the head-dress is rich, and the squarely cut eyes are remarkably prominent. The work is in good preservation, the right arm alone being wanting. The king's attitude is easy, his expression is dignified, and the outlines of his figure are boldly drawn. Small figures, which have been conjectured to represent conquered aborigines, are attached to the right and left. The identity of the attitude of the principal figure of this fine group with the attitude of the Indo-Scythian kings as shown on their coins naturally suggests that the sculpture represents one of these sovereigns. I do not know where the sculpture was found.*

Sir A. Cunningham found at Jamálgarhí fifteen or sixteen statues, some seated, and some standing, which he supposes to be those of kings, and observes that "these royal statues are known by their moustaches, and the numerous strings of gems worked into their head-dresses. The arrangement of the hair is different in each separate specimen, and, as the features also differ, there seems little doubt that they are portrait statues."†

In the case of one statue in the Lahore Museum, (No 6 of Descriptive List, and No. 63 of Dr. Leitner's Catalogue), which Professor Curtius compares with the Greek ideal type of Apollo, the royal character of the person portrayed is unmistakeably indicated by the presence of the regal fillet, the ends of which float loosely behind his head, in the same way as they are shown on the coins of Greek princes both of Europe and Asia.

It is hardly possible that all these so-called royal statues can be intended as ideal representations of Buddha as Prince Siddhártha, before he adopted the religious life, though some of them probably should be so interpreted. Mr. Fergusson suggested that they should be regarded as images of Buddhist saints, and the presence of the nimbus behind the head in many cases supports this suggestion.‡

The presence or absence of moustaches proves nothing, for Buddha is frequently represented as wearing moustaches in the works of the Gándhára school. If the images in question were portrait statues, as suggested by Sir A. Cunningham, they would probably be inscribed. It seems hardly credible that sculptors would execute numerous portraits of Kanishka and other kings without taking the trouble of indi-

* Cunningham, *Descriptive List*, No. 2; Leitner, *Catalogue*, No. 73.

† Cunningham, *Archæol. Rep.*, Vol. V, pp. 197, 202.

‡ *History of Indian and Eastern Architecture*, p. 179.

cating for whom the portraits were intended. I think it more likely that these so-called royal figures are not portraits of individuals, but that they are ideal representations, in some cases of kings, and in some cases of saints.

The museums in London and Calcutta possess several examples of sculptures of this class. Two from the upper monastery at Nuttu are depicted in Major Cole's heliogravure plates Nos. 24 and 25. The statue or statuette shown in the latter plate represents a man of dwarfish figure, standing, as if preaching, with a nimbus behind his head. The legs are thick and badly executed, and the work seems to me to be of comparatively late date, probably subsequent to A. D. 300. This figure, in spite of the ornaments and moustaches, appears intended to represent a preaching saint rather than a king.

The works above described were all, so far as is known, associated with Buddhist buildings, though in themselves not obviously Buddhist in subject. I shall now proceed to describe sculptures, the subjects of which are taken from the rich stores of Buddhist mythology.

The birth-scene of Gautama, or Prince Siddhártha, who in after days won the honourable title of the Buddha, or the Enlightened, is a favourite subject with Buddhist artists, and recurs in their works almost as frequently as representations of the Nativity are met with in Christian art.

Sir A. Cunningham, in the catalogue of sculptures excavated, chiefly at Jamálgarhí, under his supervision, enumerates four examples of this favourite subject, two of which are now in the Indian Museum, (*G. 1 and 2*).* See Plate IX, fig. 1. Major Cole gives a plate of a tolerably well-preserved specimen discovered at the upper monastery of Nuttu during subsequent explorations in the Yúsufzai country.†

According to Buddhist belief, Máyá Deví, the Buddhist Madonna, was standing under a *sál* tree, when she gave birth to the holy infant, who sprang from her right side, and was received in a golden net by Brahmá, attended by the *devas*, or angels. This legend appears to be, like the sculptures which express it, descended from a Greek original. Mr. Beal has pointed out that, in several respects, it closely resembles the Greek myth of the birth of Apollo in Delos.‡

The details of the scene vary considerably in different sculptures, but the traditional grouping of the principal figures is never materially changed. The description of one specimen will, therefore, suffice for all.

* Dr. Anderson's *Catalogue*, Part I, pp. 199, 202.

† Seven examples of sculptures of the nativity of Buddha preserved in the Lahore Museum are enumerated in Cunningham's *Descriptive List*, which, as usual, gives no indication of the localities where they were discovered.

‡ *Indian Antiquary*, Vol. IX, p. 68.

On the slab photographed by Major Cole (Plate 11) Máyá is shown, standing, facing the spectator, with her head slightly inclined, and the weight of her body thrown on the right foot. Her left leg is crossed in front, with the toes resting lightly on the ground. In her right hand she grasps a branch of the over-shadowing tree, and her left arm is thrown round the neck of her half-sister Prajápatí, who supports her. The figure of the sister is turned in a singularly awkward posture, so as to show most of her back.* The infant Buddha, springing with outstretched arms from his mother's side, is recognizable, though much mutilated; the figure of Brahmá is almost completely destroyed. The other attendants, who are introduced in some examples, are here wanting. A harp in the upper corner of the composition indicates the heavenly music which heralded the advent of him whose mission it was to still the discords of millions of human hearts.

In this work the pose of Máyá is tolerably graceful, her figure is free from the usual Indian exaggeration, and her expression, in conformity with the belief that the Buddha cost his mother none of the pangs of travail, is perfectly calm. Her hair is richly braided, and arranged in the form of a crown or tiara.

A very finely executed statuette of Máyá Deví, standing alone, which was obtained at the same monastery, (*Cole*, *Plate* 15, *figure* 2), shows her in nearly the same attitude as in the birth scene, holding above her head the branch of a conventional tree, more or less resembling a palm.

The drapery of this figure is specially elegant. The principal garment is a tunic (*chiton*) reaching to the knees, and confined at the waist, by a rich girdle of four strings, adorned with clasp and vine-leaf pendant. A scarf is thrown lightly over the shoulders, and the legs are clad in loosely fitting trousers of thin material The dress of Máyá in the nativity group is simpler, and consists of an inner tunic or vest, and a robe wound gracefully round the body, and looped up at the waist.

Single figures like that above described are not uncommon. The slight variations in different examples indicate that they were arranged in pairs.†

Religious artists found in the deathbed of Buddha a subject scarcely less fascinating than the scene of his birth.‡

* See *post*, for a parallel from the Catacombs.

† So, at Cave XX, Ajaṇṭá. "Cave XX is a small Vihára with two pillars and two pilasters in front of the verandah. One pillar is broken, but on each side of the capitals there is a pretty statuette of a female under a canopy of foliage." (Burgess, *Notes on the Bauddha Rock-Temples of Ajaṇṭá, being No.* 9, *Archæol. Survey of W. India, Bombay*, 1879). This valuable book is out of print.

‡ The *Descriptive List* mentions only one example of this subject in the Lahore Museum, but the collection there probably includes other specimens. The Indian

According to the Buddhist scriptures, he passed away at the age of eighty, surrounded by his chief disciples, shaded by the *sál* trees in a grove at a place called Kusinagara, which has been fully identified as the modern Kasiá in the Gorakhpur District of the North-Western Provinces.*

All representations of the scene agree in showing the master lying on his right side, in a posture of perfect repose, with his head resting on his hand. The number of attendants varies in different sculptures. Plates Nos. 16 and 22 of Major Cole's volume give illustrations of two well-preserved reliefs, obtained respectively at the upper and lower monasteries of Nuttu, which vividly depict the peaceful departure of the great teacher from this troublous world.

The work from the upper monastery (Plate 16) is a sculptured panel bounded by two good examples of the Indo-Corinthian pilaster.

The dying master, fully robed, reclines on a low bedstead furnished with mattress and pillow, by the side of which a tripod is placed, supporting a vessel of cool water. A figure, identified as Devadatta, the malignant cousin, who had pursued Buddha throughout his life with unrelenting hostility, stands at the head of the couch, with an evil expression of satisfied malice.†

A form, apparently that of a female, with her back to the spectator, sits crouching on the ground, and six mourning attendants in various attitudes complete the group. Above the whole hang the boughs of the *sál* tree, the forest king which witnessed alike the advent and departure of the teacher.

The work from the lower Nuttu monastery, reproduced in Plate No. 22, represents the same scene, though with considerable variation in the treatment of details. In this group the total number of figures is increased to thirteen, the most remarkable addition being that of a shaven-headed monk, crawling on hands and feet, and being pulled from under the bed by another monk, who has grasped him by the wrist.

Museum, Calcutta, contains at least one (*G.* 27). In later Buddhist art, as seen at Kasiá and elsewhere, the subject was frequently treated. The death-bed scene has often been incorrectly referred to as the Nirváṇa of Buddha, but the term *parinirváṇa* may be correctly applied to it.

* Cunningham, *Archæol. Rep.*, Vol. I, pp. 76—85; XVIII, p. 55.

† The figure is that of a man holding a dumb-bell-shaped object, like a club or conventional thunderbolt, and this figure in other reliefs, for example, in that representing the scene of the elephant doing homage, must certainly be identified as Devadatta. But the appearance of Devadatta at the death-bed of Buddha appears to be inconsistent with the legend referred to in Fa-hian's Travels, which relates that Devadatta attempted to poison Gautama, and having failed to accomplish the crime, "went down to hell."

Both the compositions above described are admirably balanced, and the attitudes and expressions of all the persons concerned are rendered with vigour and truth to nature. The drapery, as usual, is Greek, or Græco-Roman, in style.

The design of these death-bed scenes is certainly an importation from the west. The recumbent figure on the bed surrounded by morning attendants is clearly copied from Greek banqueting reliefs of a sepulchral character, as imitated on Roman sarcophagi. A sculpture in the Towneley collection in the British Museum bears a very close resemblance to the reliefs from the Nuttu manastery above described.* I have no doubt that the Gándhára sculptures were copied from Græco-Roman, and not pure Greek, models.

The figure of the founder of their religion was the decorative element most largely used by the Buddhist artists in all their works, with the exception of the earliest buildings in Bihár, Central, and Western India, where symbols occupy the place afterwards taken by images. In the countries on the north-west frontier of India, the image of the personal Buddha had become an object of worship at least as early as the latter part of the first century A. D., when it was stamped on coins of Kanishka.†

There is, therefore, no reason to be surprised at the fact that hundreds of sculptures from Gándhára, in various sizes, represent the seated or standing Buddha, posed in one or other of the conventional attitudes (*mudrá*), either buried in meditation, or engaged in exhortation. Such figures are often executed in large numbers on the face of a single slab. Multitudes of specimens present the founder of Buddhism engaged with other persons in one or other incident of his ministry or the preparation for it.

A deeply-cut relief, found at the village of Mohammad Nari, and reproduced in the first plate of Major Cole's book, is a good illustration of the oft-repeated figure of the teaching Buddha, who is here shown seated cross-legged on an open lotus-flower, with his feet draped in a gracefully disposed robe. His right shoulder is bare, and his hair is arranged in formal conventional curls, a style which in later times became the only orthodox arrangement for the hair both of Buddhist and Jain statues.

* *Engravings from the ancient marbles in the British Museum, Part V, Plate III, fig. 5, London.* 1826). In this work the Towneley relief is described as being of Roman origin, but it may be Greek. Prof. Gardner informs me that the Greek works of this class are referred to the period extending from B. C. 300 to A. D. 1.

† Gardner, *Catalogue of Coins of Greek and Scythic Kings of Bactria and India*, pp. 130, 133, 175, Pl. XXVI, 8; XXVII, 2; XXXII, 14.

The central image of the composition, the lotus-throned Buddha, occupies a niche formed by a dentilled cornice resting on Indo-Persian pillars. The rest of the slab is occupied by a profusion of "Buddhist railings" and other architectural details, as well as by a multitude of small human figures, which it would be tedious to describe at length.

The bare right shoulder and formal hair might be supposed to suggest a late date, but the style of the architectural ornaments and the fine execution of the work indicate, in my judgment, that it should be referred to the first half of the third century A. D. I have already noted that this slab is adorned with Indo-Corinthian pilasters as well as Indo-Persian pillars.

One of the most elegant images of the standing, preaching Buddha is the small statuette from the Mián Khán monastery depicted in figure 3 of Major Cole's Plate 27. The expression of the face is sweet and calm, and the drapery is rendered in the best style. Both shoulders are covered, and the hair, coiled in a top-knot, is artistically and truthfully sculptured. This work seems to me to be of earlier date than the Mohammad Nari specimen, and is probably not later than A. D. 200.

The fine sculpture from the upper monastery at Nuttu (Cole, Plate 12) shows Buddha, wearing moustaches, and with both shoulders covered, seated cross-legged on a low stool under a *sál* tree, addressing a company of adoring disciples of both sexes.

The balanced grouping of this composition is as skilful as that of the death-bed scenes.

The three sculptures above described belong to the best period of the Gándhára school of art.

A statuette of the seated Buddha, about 13 inches in height, executed in blue slate, is shown in Plate IX, fig. 2, and is an example of the school in its decadence. A similar statuette was obtained at Ráṇígat,* and is fairly good work, though not of the best style.

Another statuette of the seated Buddha, found at Sháh kí dherí, the ancient Taxila by Mr. L. White King, seems to be of comparatively late date, having a Hindú, rather than a Buddhist appearance.

* The great fortress of Ránígat, (also known by the names of Nográm, or Navagrám, and Bágrám), is situated sixteen miles north of Ohind, and just beyond the British frontier. Tribal feuds render the place difficult of access, and, when Mr. King visited it, he required the protection of a strong escort. The ruins have, consequently, never been thoroughly explored. Sir A. Cunningham gives weighty reasons for identifying the site with Aornos, the stronghold which resisted Alexander. The surface of the various courtyards is covered with fragments of "statues of all sizes, and in all positions." *(Archæol Rep., Vol. II, pp.* 96—111; *V, p.* 55*)*. Major Cole in his Second Report notes the existence of seven topes or *stúpas* within the limits of the fortress, and gives a rough plan on a very small scale.

The foregoing descriptions prove that during the most flourishing period of Gándhára art, which I assign to the years between A. D. 200 and 350, the conventional representation of Buddha had not been finally determined, and that it was legitimate to make his image either with or without moustaches, and with the right shoulder either bare or draped. The figure of Buddha on the Amarávatí slab No. 11 exhibited on the British Museum staircase has both shoulders draped, but in Buddhist art, as a rule, the founder of the religion is represented with the right shoulder uncovered, and without moustaches.

It has also been shown that the artists of Gándhára were at liberty to give Buddha either the formally curled hair, which in later times, became an indispensable attribute, or to carve his hair artistically in accordance with nature.

The treatment of the hair both of Buddha and other personages in most of the good sculptures from Gándhára is so artistic, and so far superior to the feeble conventionalism of ordinary Indian art, that it may be well to dwell on the subject for a moment.

I agree with Dr. Anderson, in the opinion expressed by him that the woolly hair like that of a negro, arranged in stiff, formal, little curls which is characteristic of the Jain images executed in the tenth and subsequent centuries, and of many Buddhist statues of earlier date, does not indicate, as has been supposed, any racial peculiarity of the Jain and Buddhist saints, but is purely conventional.

Dr. Anderson suggests that this mode of representing the hair is merely an archaistic survival, and that "the hair of the Blessed One having once been carved in this depraved fashion, it was slavishly followed after, with a few exceptions, among which were the sculptors of Gándhára."*

The exact origin of this archaistic treatment of the hair does not at present appear to be traceable, but, whether it be ever discovered or not, it is probable that the explanation suggested above, is, in general terms, the correct one, and that there is no occasion for holding with Mr. Fergusson, that "it has ever been one of the puzzles of Buddhism that the founder of the religion should always have been represented in sculpture with woolly hair like that of a negro."†

As a matter of fact he is not always so represented, nor is the woolly hair peculiar to his images. The puzzle, if it be a puzzle, is one in the history of art, not in the history of religion.

The archaic 'wiry' style of representing the hair was maintained

* Anderson's *Catalogue*, Part I, p. 259. Cf. *ibid.*, p. 175; and *Indian Antiquary*, Vol. IX, p. 116.

† *Tree and Serpent Worship*, 2nd ed., p. 135.

by Greek artists in bronze longer than in marble,* and this observation may possibly serve as the explanation of the woolly-haired Buddhas, which may be conjectured to have been derived from a bronze prototype.

I cannot venture on trying the patience of my readers by describing even a few of the many friezes and panels which vividly present incidents of Buddha's life and preaching, such as his visits to ascetics and Nága kings, and his miraculous escapes from the snares laid by Devadatta. The compositions are like most Roman work, generally crowded with figures, which it would be tedious to describe in detail. Good illustrations of several are given in Major Cole's Plates.

A blue slate panel, about 13 inches in height, representing in high relief a *chaitya* front filled with small figures of Buddha and worshippers, the original of which is in the Lahore Museum, a cast being in Calcutta, is reproduced in Plate IX, fig. 3, and is a fair example of a very numerous class of works.

The sculptors of Gándhára were not restricted in their choice of religious subjects to the birth, death, meditation, miracles, and preaching of Gautama.

At the time when they flourished, Buddhist literature had attained vast dimensions, and offered, in the collections of *Játakas*, or Birth-stories relating to the adventures of the Buddha in his previous births, an inexhaustible treasury of subjects for the art of the painter and the sculptor.

That subjects of this class frequently formed the theme of the Græco-Buddhist artists can be perceived from the mutilated extant fragments of their compositions, though the brittleness of the stone in which their works were generally executed is such that few of the innumerable friezes which decorated the buildings of Gándhára have been preserved in a condition sufficiently perfect to permit of their story being clearly read.

The best preserved connected series of story-telling sculptures is that which adorned the risers of the sixteen steps leading to the central *stúpa* of the monastery at Jamálgaṛhí, excavated by Lieut. Crompton and Sir A. Cunningham.†

* Perry, *Greek and Roman Sculpture*, p. 351.

† Lieutenant Crompton's report has not, so far as I am aware, been printed in full. Its substance is given in the *Indian Antiquary*, Vol. III, p. 143. The friezes of the risers are the only sculptures found in their original position at Jamálgaṛhí. All the others had been thrown down, and "in many cases large and heavy fragments of the same sculpture were found far apart." Lieut. Crompton hence concluded that the buildings had been "destroyed by design, and not by natural decay." Sir A. Cunningham's catalogue of the sculptures of the risers arranged in the order of the steps is given in *Archæol. Rep.*, Vol. V, p. 199.

These reliefs excited the warm admiration of Mr. Fergusson, and are certainly deserving of high praise.* Unfortunately they are far from complete. The surviving portions, however, are of considerable extent, and are available for study in Cases 1—3 of the Asiatic Saloon in the British Museum. The arrangement in the museum is arbitrary, and determined rather by the dimensions of the cases than by the order of the steps, or the subject of the sculptures.

When first discovered the series was more nearly perfect, and the discoverer was able to recognize two *Játakas* or Birth-stories, the *Wessantara* and the *Sáma*.

The latter may be read pretty clearly from the remains in the British Museum (Cases 1—3, tier No. 4). The recognizable scenes are briefly described by Sir A. Cunningham as follows:—

"1.—The young lad, son of blind parents, filling a vessel with water from a lake frequented by deer.

2.—The youth, shot accidentally by the Rájá of Benares, who aimed at the deer, is lying on the ground with an arrow sticking in his side.

3.—The Rájá in a pensive attitude, his head resting on his hand, promises to take care of the lad's parents.

4.—The Rájá presents a vessel of water to the blind parents.

5.—The Rájá leads the two blind people by the hand to the spot where their child's body is lying.

6.—The youth restored to life."

This story occupied the eighth step of the staircase. The *Wessantara Játaka*, which adorned the fourth step, is exhibited on the fifth tier from the top of the British Museum arrangement.

The extremely small scale of these sculptures, which are only about eight inches high, interferes with the correct proportional rendering of the several parts. The trees, for instance, are altogether out of scale. But, when allowance is made for this defect, which is unavoidable in the execution of complicated designs crowded into a space so limited, these reliefs may rightly be held to deserve much praise for their vigour of execution, and for their realistic fidelity to nature.

An exhaustive description of the various scenes and multitudinous figures in the *alti-relievi* of the Jamálgaṛhí staircase would task too severely the patience of the most conscientious reader, but a brief discussion of some of their more interesting features may not be unwelcome.

The uppermost tier in the museum arrangement comprises ten small panels, divided one from the other by broad Corinthian pilasters.

* *History of Indian and Eastern Architecture*, p. 173.

Six of these panels, (from the third step of the staircase), are occupied by female busts with the arms raised, and having acanthus leaves extended like wings from the waist on each side. These little figures at once remind the spectator of the angels with which he is familiar in Christian art. It is quite possible that the sculptors of Gándhára may have picked up some hints from artists connected with the churches of Asia Minor and Syria, and I have a suspicion that they did so, though I cannot offer any decisive proof of the supposed fact. I have no doubt that a real connection exists between early Christian art and the Gándhára school. The four remaining panels (from the fifteenth step) contain each a grotesque bust terminating in two scaly tails.

Above these panels nine remarkable Atlantean statuettes are exhibited, which form, apparently, part of a set of twenty-three obtained at Jamálgarhí by Sir A. Cunningham. He supposes that they "filled the spaces between the large dentils which supported the heavy mouldings of the *stúpas*,"* or, as he elsewhere expresses himself, that "they were arranged in rows to support the lowermost moulding of a building. The figures were generally separated by pilasters."†

Numbers of similar figures have been found. Most commonly they are about eight inches high, but they vary in height from four to eighteen inches.‡

The British Museum specimens range in height from about seven to nine inches. All the figures are in a sitting posture, though the attitude varies. One figure crouches like Atlas, as if oppressed under the burden of a heavy load, while the attitudes of the others seem to express repose rather than the endurance of crushing pressure. Some of the faces are bearded, and some are not. The facial expression is freely varied, and rendered with great spirit and vigour. The muscles of the chest and abdomen are fully and truthfully displayed, with a tendency to exaggeration, and a pair of expanded wings is attached to the shoulders of each statuette.

A group of wrestlers (*G.* 82 *Calcutta*), and a composition (*G.* 89 *Calcutta*), catalogued by Sir A. Cunningham as "Herakles fighting with a snake-legged giant," both of which were found at Jamálgarhí, are executed in the same style. The latter work (Plate IX, fig. 4) is

* *Archæol. Rep.*, Vol. V, p. 198.

† *Descriptive List*, p. 2.

‡ *Descriptive List*, and *Indian Antiquary*, Vol. III, p. 144 Sixteen statuettes of this class are in the Calcutta Museum (*G.* 81 *and* 83). A feeble terracotta imitation of the design has been found far away eastward in the Bogra (Bagrahá) District of Lower Bengal. (*Mn.*, 1, in Anderson's *Catalogue*).

thus described by Dr. Anderson in his Catalogue (Part I, p. 240):—"A triangular fragment, with two figures in relief, one lying on the ground with its back towards the spectator, the upper portion being the body of a human being, but the legs terminate from the hips downward in two snake-like coils; the other figure, which is quite nude, has grasped the end of the left coil with his right hand, while with his left hand he has seized the head of the monster, which swings a heavy club to destroy his foe."

I think that it is impossible to doubt that the group last described is a Buddhist adaptation of the Greek myth of the Gigantomachia, the battle of the gods and giants, which continued for centuries to be a favourite subject of Greek and Roman sculptors and gem-engravers. In Greek and Roman art the giants are represented as winged, and snake-legged, and their figures are generally characterized by exaggerated development of the muscles.

No Indian example appears to reproduce exactly the conventional form of the Greek giant, but the characteristics of that form are all found in the Jamálgaṛhí carvings, though not all combined in a single figure.

The action of the group which Sir A. Cunningham rather rashly entitles "Herakles fighting with a snake-legged giant" is obviously the same as that of the Greek representations of the Gigantomachia, and the very peculiar conception of the snake-legged giant cannot have been independently invented by the Jamálgaṛhí sculptors. In this case the wings seem to be wanting, but the Atlantean statuettes, which have not the snake legs, are fitted with wings, and display the exaggerated muscular development of the pattern Greek giant. The little figures with tails, from the fifteenth step, appear related rather to the Tritons than the Giants. Their tails seem to be intended rather for those of fishes than to represent snakes.

The Gigantomachia was so frequently the subject of Greek and Roman works of art that it is impossible to name the precise channel by which a knowledge of it reached India. One of the finest examples of the treatment of the subject is the principal frieze of the great altar of Pergamon, the giants of which are winged, snake-legged, and provided with enormously developed muscles.* It is quite possible that the fame of this great composition may have spread through Asia, and stimulated the imitative faculties of a host of minor artists, including those of Gándhára, but the Gigantomachia was such a hackneyed subject that we cannot venture to name any particular example of its

* Casts of the Pergamene frieze are at South Kensington. Engravings of it will be found in many recent books, *e. g.* Perry's *History of Greek and Roman Sculpture.*

treatment as the model of the miniature, and comparatively feeble, adaptations of it by the Indian sculptors. The influence of Rome on the sculptures at Jamálgaṛhí, and the other works of the Gándhára school, belonging to the same period, is so strongly marked that the most probable conclusion is that the Indians derived their knowledge of the artistic use of the Gigantomachia from Roman copies of Greek works.

I strongly suspect that the Indians borrowed from the Greeks the giants themselves as well as the sculptured representations of their battles. The Asuras of Hindú post-Vedic mythology are described as fierce demons, enemies of the gods, and correspond closely with the Greek giants. Recent research has proved, or at least rendered probable, the existence of so much Greek, and even Christian, influence on the development of Hindú mythology that the borrowing of the conception of giants, enemies of the gods, offers no improbability.

Whether the Buddhist sculptors of the Kábul valley intended their snake-legged or winged monsters to be images of Asuras, or merely used them as conventional imitative decoration I cannot undertake to determine.

A group, frequently recurring in Gándhára art, of which four examples have been photographed by Major Cole (Plates 1, 2, 4, and 17), and one is in the Woking Museum, can be demonstrated to be an adaptation of a famous composition by a known Greek artist. Another of the ultimate Greek sources from which the sculptors of Gándhára derived their inspiration is thus determined with certainty. I shall discuss this case with some fulness of detail.

The group referred to represents a plump young woman, fully draped, standing, held in the grasp of an eagle with expanded wings, and is reasonably conjectured to represent the translation to heaven of Máyá Deví, the mother of Buddha, in order that she might be born again, as related in the Buddhist scriptures. However this may be, it is quite impossible to doubt the correctness of Sir A. Cunningham's opinion, as quoted by Major Cole, that the composition in question is an adaptation of the Rape of Ganymede, a favourite subject of the later Greek artists, and of their Roman imitators.

The bronze work on this theme by Leochares (B. C. 372-330) was considered a masterpiece of that famous artist of the later Attic school, and was praised with enthusiasm by Pliny.

The original has unfortunately perished, but several copies or imitations of it, belonging to various periods, some executed in marble, and some engraved on gems, are extant, and have been figured in many well-known works on the history of art.

One of the marble copies is in the British Museum, another is at Thessalonica, a third at Venice, and a fourth, the finest of all, is preserved in the Museo Pio Clementino at the Vatican.*

In this composition, which most nearly corresponds with Pliny's description of the original, the eagle is represented as supported by the trunk of a tree behind it, with its wings expanded, and neck stretched upwards, and grasping firmly, though tenderly, in its talons the beautiful youth, whose feet have just ceased to touch the receding earth. The robe of Ganymede is dexterously disposed behind his back so as to protect his body from the sharp claws of the great bird, and yet to exhibit the full beauty of the nude figure. A dog, seated below, howls piteously for his departing master.

Critics point out that the addition of the dog to this group, and the insertion of the tree, are not only in accordance with the myth as related by Virgil,† but are of artistic importance as an aid to the imagination by rendering more perceptible the soaring movement of the principal figures, and thus minimizing the objections to a plastic presentation of a pictorial subject.

The Buddhist adaptations omit the dog, and in this respect agree with the groups preserved at Venice, Thessalonica, and in the British Museum, but, in the pose of the eagle, and the introduction of the trunk of the tree, they resemble the Vatican group more closely than any other.

Three of the examples of these adaptations figured by Major Cole (Plates 2, 3, and 4) were found in the ruins at Sanghao. His fourth example (Plate 17) was obtained at the upper monastery of Nuttu, which is situated close to Sanghao. The Sanghao specimens figured in Plates 3 and 4 are duplicates, whereas the Nuttu specimen agrees with the Sanghao sculpture illustrated in Plate 2.‡

* Overbeck (*Mythologie der Kunst*) has pointed out that the extant Rape of Ganymede groups fall into two distinct classes. The first represents the eagle as the messenger of Zeus; the second presents the god himself transformed into the shape of an eagle. The Vatican group is the best example of the first and earlier, the Venetian sculpture is the best example of the second and later type. Engravings of the Vatican group will be found in Visconti's *Museo Pio-Clementino*, Vol. III, p. 149, and in the histories of sculpture by Winckelmann, Lübke, and Perry. A figure of the Venetian specimen is given in Zanetti's work on San Marco. The Thessalonican group is described and engraved in Stuart's *Athens*, III, ch. 9, Pl. II and IX. The Indian adaptations seem to combine the characteristics of both types.

† "Puer .... quem præpes ab Ida
Sublimem pedibus rapuit Jovis armiger uncis;
Longævi palmas nequidquam ad sidera tendunt
Custodes, sævitque canum latratus in auras." (Æneid, V, 252-257).

‡ Major Cole says that Sir A. Cunningham found an example of the woman and eagle subject in a knob or plume of a royal statue at Jamálgarhí, which is now

Both the Buddhist variations show a general agreement with one another, though differing considerably in detail. The posture of Máyá in the specimens figured in Plates 2 and 17 is singularly ungraceful and constrained. As some compensation for this defect her feet are so treated as to suggest the notion that she is really being lifted from the ground, and in this respect these examples are superior to the other two, which altogether fail to convey the idea of upward motion. In both varieties the female figure is fully draped.

The substitution of a fat, round-cheeked, young Indian woman, swathed in heavy drapery, for the nude form of Ganymede instinct with the beauty of Greek youth, destroys all the æsthetic value of the composition, which is, in its Buddhist forms, devoid of life or elegance, and far inferior to the worst Græco-Roman example. The conversion of a Greek theme to their own uses by the Gándhára sculptors is more readily demonstrated in the case of the Rape of Ganymede than in any other, but, unfortunately for their reputation, they were less successful in dealing with this subject than almost any other which they attempted. Probably it would be correct to say that a purely ideal subject was beyond their powers.

A very curious panel in the Lahore Museum, of which a cast is exhibited at South Kensington, has been differently interpreted by Sir A. Cunningham and Dr. Leitner.

The former describes it as a "portion of a large sculpture, containing eleven figures. The three lower ones are soldiers armed with spears and shields; but the rest, with their animal's heads, large mouths, and sharp teeth, are probably intended for demons. As such they may have formed part of the army which Mára brought to frighten Buddha during his ascetic meditation under the Bodhi tree." (*Descriptive List*, 538.)

The three soldiers in the lower compartment, marching one behind the other, are certainly not Indian in style or equipment. They are Greek, not Roman warriors. Two of them carry long oval shields, the shield of the third differs in shape, having a rectangular body, and circular head, with narrow neck. Sir A. Cunningham's conjecture as to the meaning of the composition fails to explain the presence of these soldiers.

Dr. Leitner, who has seen Buddhist masquerade processions in Ladákh, informs me that he regards the monstrous forms in the upper part of the panel as intended to represent the masks of the Vices in a

in the Calcutta Museum, but the Catalogue does not mention any such specimen. G. 40, a sculpture ten inches high, seems to deal with the same subject, although Dr. Anderson does not recognize it. So large an object can hardly have formed part of a knob or plume.

procession of Vices and Virtues, and that the soldiers may be interpreted as the escort. In his Catalogue he gives a somewhat different explanation.

Whatever be the correct interpretation of this strange composition, it is certainly one of the best, and presumably among the earliest, works of the Gándhára school. All the figures are well executed, and the aged and monstrous heads in the upper compartment are carved with great cleverness and spirit. It probably, like the Athéné, belongs to the pre-Roman period.

Inasmuch as my object in this paper is not the publication of an exhaustive monograph on the Gándhára school of sculpture, but the presentation of a general view of the modes of Græco-Roman influence on India, though with special reference to the Gándhára sculptures, I shall not proceed further in the detailed description of works from the Kábul valley, which deal with subjects obviously belonging to the domain of Buddhist mythology.

Certain decorative elements, which are not peculiar to the Gándhára school, but also occur in the earlier sculptures at Bhárhut and Buddha Gayá in the interior of India, are mythological, but not in themselves, so far as appears, specially connected with Buddhist mythology. I allude to the hippocamps, centaurs, tritons, and various winged and other monsters, which are frequently met with. These forms, which are certainly of Græco-Roman origin, so far as India is concerned, were probably used by the Buddhist artists for purely decorative purposes, without any definite symbolical meaning. Such monsters were common in Greek art, and are supposed especially to characterize the works of the followers of Scopas.

The comic friezes in which boys are shown pulling cattle by the tails, riding on lions, and disporting themselves in sundry fantastic ways, are obviously not Indian in design. Major Cole's plate 26 illustrates a tolerably good specimen from the Mián Khán monastery of such a comic frieze, the figures in which are boys mounted on lions.

The direct model for these works was probably found in Roman art. Their ultimate source is to be traced to the Alexandrian compositions depicting the "*erotopœgnia* (love-sports, amatory poems) of the Anacreontic school, in which Eros becomes a boy, and rides all sorts of wild animals and monsters, lions, panthers, boars, centaurs, hippocamps, dolphins, dogs, and deer."*

Among the remains of the Gándhára sculptor's work an extraordinary abundance of detached human heads, chiefly executed in stucco, is met with.

* Perry, *History of Greek and Roman Sculpture*, p. 629.

The cases in the British Museum contain a series of about forty such heads, varying from life-size to very small dimensions. Most of these were obtained in the Pesháwar District. and purchased in 1861 through the late Mr. Thomas.* They are as varied in character as in size, and comprise old and young, male and female, serious and comic. Almost all are good, but I was particularly struck by the head, five or six inches in height, of an aged, emaciated, and bearded man, and the very remarkable life-size head of a laughing youth, with large straight nose, big projecting ears, and a curl of hair on his forehead.

Dr. Leitner has a considerable number of similar heads in his collection, and, as he observes, it is impossible not to notice the resemblance between them and the heads found in Cyprus, specimens of which may be seen in the British, South Kensington, and Woking Museums.

The specimens from the Pesháwar District, in the Indian Museum, Calcutta, marked P 1—18, are similar, and some particularly good examples of such heads, found in the Mián Khán monastery, are figured in Major Cole's Plate 28.

Two plaster heads of this class are figured in plate IX, fig. 5, *a* and *b*. They are about each six inches in height. The head reproduced in fig. *a* is very Greek in feature, though Indian in ornament. The photograph, in consequence of foreshortening, does not do the face full justice.

The great abundance of such detached stucco heads is probably to be explained, at least in part, by the following observation of Masson, who notes that at the village of Hidda, near Jalálábád in the upper Kábul valley, "idols in great numbers are to be found. They are small, of one and the same kind, about six or eight inches in height, and consist of a strong cast head fixed on a body of earth, whence the heads only can be brought away. They are seated and clothed in folds of drapery, and the hair is woven into rows of curls. The bodies are sometimes painted with red lead, and rarely covered with leaf-gold; they appear to have been interred in apartments, of which fragments are also found."†

### *Section IV.* Hellenistic Sculpture in India Proper.

An exhaustive examination of all the known remains of early Buddhist sculpture which exhibit traces, more or less distinct, of teaching derived from Greek sources would, I fear, be extremely tedious,

* Information kindly supplied by A. Franks, Esq., F. R. S.

† *Ariana Antiqua*, p. 113.

and would certainly extend this paper far beyond the limits to which I desire to confine it. The Hellenistic influence on India Proper was slight, and no site in the interior of India contains the remains of a distinct, well-established Greek, or Græco-Roman, school of art, such as existed in Gándhára. I shall, therefore, content myself with a mere passing reference to most of the Indian cases in which the marks of western art teaching have been detected, and shall describe in detail only a few specially interesting works.

The honeysuckle ornament on the capitals of some of the monoliths of Aśoka (B. C. 250) is the earliest example of a Greek form of decoration applied to Indian work. Mr. Fergusson has suggested that Aśoka borrowed this ornament direct from its Assyrian or Babylonian birthplace, and not from the Greeks,* but, considering the fact that, even in Aśoka's time, Assyrian and Babylonian art belonged to a distant past, it seems much more natural to suppose that the Ionic honeysuckle ornament was introduced into India from the Greek kingdoms of Asia with which Aśoka was in communication.

I have already alluded to the tritons, hippocamps, and other marine monsters which formed part of the ordinary Greek decorative stock-in-trade, and passed into Indian art.

The centaur, another characteristic Greek form, is found among the sculptures at Bhárhut, dating from about B. C. 150, and among those at Buddha Gayá, which are somewhat earlier.†

The chariot of the sun, in Indian mythology, is drawn by seven steeds. At Buddha Gayá in Bihár, and again at Bhájá in the Bombay Presidency, we find it represented drawn by four steeds, as in Greek art.‡ Mr. Fergusson also draws attention to the Greek look of "the figure of the spear-bearer" in the Bhájá cave temple.§ The same writer detects the presence of a distinctly Greek element in the well-known sculptures of Amarávatí on the Krishṇa river, and such an element may certainly be traced in them, though its presence is not very obvious on casual inspection.‖

* *Cave Temples*, p. 521.

† For a full descriptive account of the sculptures at Bhárhut, see Sir A. Cunningham's special work on the subject. Centaurs at Buddha Gayá and Bhárhut are described in Anderson's *Catalogue*, Part I, p. 129, where further references are given.

‡ For the Buddha Gayá sun chariot, see Cunningham, *Archæol. Rep.*, Vol. III, p. 97; *Buddha Gayá* by Rájendralál Mitra, Plate L; Fergusson and Burgess, *Cave Temples*, p. 521. For the Bhájá example of the same design see *Archæol. Survey of W. India*, Vol. IV, p. 5, Pl. VI.

§ *Cave Temples*, p. 521, Pl. XCVI, 5.

‖ See *Tree and Serpent Worship*, 2nd ed., pp. 106, 172.

The most distinct and conspicuous remains of Indo-Hellenic art in the interior of India are those which have been discovered at the ancient city of Mathurá, situated on the Jamuná about thirty-five miles from Agra.

A group in sandstone, found at or near Mathurá, was described and figured more than fifty years ago by James Prinsep as representing Silenus with his attendants, and a second corresponding, though not identical, group has since been discovered by Mr. Growse in the neighbourhood of the same city.

The block first found is three feet broad, and three feet eight inches high, hollowed on the top into a shallow basin, perfectly smooth, and originally nearly circular, and is sculptured back and front with figures in high relief.

"In the front group the principal figure is a stout, half-naked man, resting on a low seat, with wig or vine-crowned brow, out-stretched arms, which appear to be supported by the figures, male and female, standing one on each side. The dress of the female is certainly not Indian, and is almost as certainly Greek. * * * Prinsep agrees with Stacey in considering the principal figure to be Silenus:—'His portly carcass, drunken lassitude, and vine-wreathed forehead, stamp the individual, while the drapery of his attendants pronounce them at least to be foreign to India, whatever may be thought of Silenus' own costume, which is certainly highly orthodox and Brahmanical. If the sculptor were a Greek, his taste had been somewhat tainted by the Indian beau-ideal of female beauty. In other respects his proportions and attitudes are good; nay, superior to any specimen of pure Hindu sculpture we possess; and, considering the object of the group, to support a sacrificial vase (probably of the juice of the grape), it is excellent.'"*

Prinsep's account of the purpose of the block described by him, and his interpretation of the sculptures have both been disputed. I shall not enter into the controversy on the subject, which may be read in the works cited in the note. Personally, I am of opinion, that the drunken man is an Indian adaptation of Silenus.

A third work, much in the same style, and still more obviously

* Cunningham, *Archæol. Rep.*, Vol I, p. 243. Prinsep's original account will be found in *Journal As. Soc. of Bengal*, Vol. V, (1836), pp. 517, 567, Pl. XXXI. The sculpture described by Prinsep and its subsequently discovered companions are discussed by Mr. Growse, and illustrated by good plates, in the same *Journal*, Vol. XLIV, Part I (1875), p. 212, Pls. XII, XIII, and are further commented on by the same writer in *Mathurá, a District Memoir*. See also Anderson's *Catalogue*, Part I, pp. 170—176.

Greek in subject and treatment, was discovered in 1882 by Sir A. Cunningham, also at Mathurá, where it served an humble purpose as the side of a cattle-trough. This unique specimen now adorns the Indian Museum, Calcutta. Dr. Anderson's careful, though rather awkwardly worded, description of it is as follows :—

"*M.* 17.—A figure of Hercules in alto-rilievo, 2 feet 5 inches high, strangling the Nemean lion. The latter is represented standing erect on its hind feet, but grasped round the neck by the left arm of Hercules, who is pressing the neck against his shoulder. The right arm of the statuette is broken off, but, as the axilla is exposed, the arm had been represented raised and bent on itself at the elbow, so that the hand had been brought down close to the shoulder, but hidden in the foliage behind the figure, the tree being the same as occurs in the Silenus group. The greater portion of the knotted club is seen behind the right side of the figure. The action, therefore, is not only that of strangling, but of clubbing the lion as well. The head of Hercules has been lost, and the front part also of the head of the lion. He (*scil.* Hercules) is represented as having worn the skin of an animal over his back, as the front limbs are tied before his chest in a loop-knot, the free ends being the paws. The beard of the lion is indicated by parallel pendants, and, on the full rounded left cheek, there is a somewhat stellate figure with wavy arms, probably a rude Swastika. The fore-limbs of the lion are raised to the front of its neck, grasping the left hand of Hercules, but they are very feebly executed. The general art characters of the figure are essentially Grecian, but, in the attitude in which Hercules is placed towards the lion, and the consequent position of his right arm, it would be extremely difficult to deal any but the most feeble blow. Although there is considerable anatomical accuracy in delineating the position of the various muscles brought into play in Hercules, the lion is devoid of action and badly shaped."*

These Mathurá sculptures have very little in common with those of Gándhára, and seem to be the work of a different school. They have not the Roman impress which is so plainly stamped on the art of Gándhára, and are apparently the result of Greek teaching conveyed through other than Roman channels. It is difficult to fix their date with precision. It cannot well be later than A. D. 300, and the style is not good enough to justify the suggestion of a very early date. Perhaps A. D. 200 may be taken as an approximate date for these works, but at present their chronological position cannot be definitely determined.

* *Catalogue*, Part I, p. 190.

They are by no means, in my opinion, equal in merit to the best of the Gándhára Indo-Roman sculptures, which I assign to the third century A. D.

The Mathurá group of Herakles and the lion may be contrasted with the widely different representation of the same subject recently found at Quetta in Balúchistán. A much corroded copper or bronze statuette, two and a quarter feet high, discovered at that place, shows the hero standing, and holding under his left arm either the skin or dead body of the slain lion, the right arm being wanting.* This work, to judge from the published plate, has an archaic look, and bears a curiously close resemblance to the colossal figure found at Khorsábád in Assyria, fancifully named Nimrod by Bonomi, and designated the Assyrian Hercules by other writers. "He is represented strangling a young lion, which he presses against his chest with his left arm, while he is clutching in his hand the fore-paw of the animal, which seems convulsed in the agony of his grasp. In his right hand he holds an instrument which we infer to be analogous to the boomerang of the Australians," etc.†

I cannot venture to assign even an approximate date for the Quetta statuette, and can only say that it is certainly an early work.

## *Section V.* The Chronology and Affinities of the Gándhára or Pesháwar School of Sculpture.

It is impossible to determine the affinities of a school of art until its chronological position is known at least with approximate accuracy. Apparent resemblances between the works of different schools are apt to be delusive and misleading unless checked by chronological dates independent of the idiosyncrasies of the critic. On the other hand, the style of the works of art, the date of which is in question, is in itself, when used with due caution, an essential element for the determination of the chronology, if conclusive external proof is not forthcoming. In the case of the Gándhára school its chronology and affinities are both still to a large extent undetermined. I shall quote subsequently the divergent judgments of the principal authorities on the subject. For the present I shall confine myself to the examination of the external evidence for the chronology of the Gándhára sculptures. This evidence falls chiefly under three heads, namely, (1) Epigraphic, (2) Numismatic, and (3) the records of the Chinese pilgrims. The pilgrims' testimony, supplemented

* *Journal As. Soc. of Bengal*, Vol. LVI, p. 163, Pl. X.

† Bonomi, *Nineveh and its Palaces*, 2nd ed., p. 163, Plate X.

by scanty historical data from Indian sources, will be more conveniently dealt with in connection with the internal evidence derived from style. The other two heads may here be considered.

The epigraphic material in the Gándhára region is unfortunately meagre in quantity, and the little that exists gives but a small amount of information.

The local inscriptions, known in 1875, are enumerated by Sir A. Cunningham,* and comprise the following records, namely, from

| | | |
|---|---|---|
| (1.) | Jamálgaṛhí. | (*α*) Certain mason's marks;<br>(*β*) The Indian names of a weekday and a month on a pilaster;<br>(*γ*) Seven unintelligible letters, read as *Saphaë danamukha*, incised on the back of the nimbus of one of the statues supposed to be those of kings. |
| (2.) | Kharkai. | (*α*) Masons' marks;<br>(*β*) Three characters, read as *a*, *ra*, and *de*, on the sides of a small stone relic-chamber. |
| (3.) | Zeda. | Inscription of Kanishka dated in the year 11. |
| (4.) | Ohind. | A fragment dated in the month Chaitra of the year 61. |
| (5.) | Takht-i-Bahí. | Inscription dated in the 26th year of Mahárája Guduphara, in the year 103 of an undetermined era. |
| (6.) | Panjtár. | Inscription of a Mahárája of Gushán or Kushán tribe, dated in the year 122. |
| (7.) | Saddo. | The Indian name of a month on a rock. |
| (8.) | Sahri-Bahlol. | The Indian name of a month on a fragment of pottery. |

Inasmuch as Taxila may be included for the purposes of the history of art in Gándhára, the Taxila inscription of the Satrap Liako Kusulako, dated in the 78th year of the great king Moga, should be added to the above list.

I have lately obtained an inscription on the pedestal of a statuette of Buddha dated in the year 274.

All the inscriptions above referred to are in the alphabet variously designated as Arian, Ario or Ariano-Pálí, or Bactrio-Pálí, which is written from right to left, and was employed by Aśoka (B. C. 250) in

* *Archæol.* Rep., Vol. V, pp. 57—64.

his edict inscription engraved on the rock at Sháhbázgaṛhí (Kapurdagiri) in the Gándhára country. The use of this alphabet never became general in the interior of India, and certainly died out there altogether at an early date, not much subsequent to the Christian era.

These facts have been utilized by Sir A. Cunningham as an argument for the early date of the Gándhára sculptures, but the argument seems to me devoid of all force. When he wrote his Report the latest known date for an Arian inscription was the year 122, recorded in the Panjtár document, and this date was then believed to refer to the era known by the name of Vikrama, B. C. 57. Sir A. Cunningham, therefore, argued "As no Indian letters have been found on any of them, I conclude that the whole of the sculptures must belong to the two centuries before and after the Christian era, as the Arian characters are known to have fallen into disuse about A. D. 100 or a little later."

No one now believes that the Indo-Scythian era is the same as that of Vikrama, and most archæologists hold, though conclusive proof is still wanting, that the Indo-Scythian inscriptions are dated in the Śaka era of A. D. 78. If this correction be applied, Sir A. Cunningham's argument will mean that all the Gándhára sculptures must be prior to A. D. 250.

One premise of this argument has been destroyed by the discovery of an Arian inscription dated 274, equivalent to A. D. 352, if referred to the Saka era. That inscription at the present moment happens to be the latest known, but there is no reason why one still later should not be found. The absence of Indian letters on the Gándhára sculptures simply proves that the Indian alphabet was not used in that part of the country, which fact was known already for an earlier period from the existence of Aśoka's Sháhbázgaṛhí inscription.

The Arian character never took root in India Proper, and its early total disuse there gives no indication as to the date of its disuse in its original home in the countries on the north-west frontier. I should not be surprised, if an Arian inscription dated as late as A. D. 500 should be discovered in Afghánistán or the Western Panjáb.

The Gándhára sculptures can be proved, on other grounds, to be earlier than A. D. 500, up to which date the Arian character may well have continued in use in the country where they occur. The fact, therefore, that the Gándhára inscriptions are all in the Arian character, does not help in any way to fix the date of the sculptures, much less does it prove that they are earlier either than A. D. 100 or A. D. 250.

Among the inscriptions in Sir A. Cunningham's list those from Zeda, Ohind, Takht-i-Bahí, Panjtár, Saddo, and Sahri-Bahlol, are not closely associated with Græco-Buddhist sculptures. The valueless Saddo

fragment inscribed on a rock is the only one among these records found in its original position. These inscriptions consequently give no warrant for the assumption that the Græco-Buddhist sculptures are contemporary with Kanishka or Gondophares, who are mentioned in some of the documents.

The Arian inscriptions at Kharkai and Jamálgaṛhí are incised on works of the Græco-Buddhist or Gándhára school, but are too fragmentary to be of any use. Sir A. Cunningham wishes to read the characters *a*, *ra*, *de*, on the Kharkai relic-chamber as Árya Deva, the name of a Buddhist patriarch who flourished late in the first century A. D, but this interpretation is purely conjectural, and cannot be admitted.

The result of all the foregoing discussion is the negative conclusion that, with the exception of the image of Buddha dated 274, no epigraphic evidence to prove the date of the Gándhára sculptures has yet been discovered.

This unique dated inscription is of sufficient interest to deserve a particular description. I am indebted to the kindness of Mr. L. White King, B. C. S., for permission to publish it.*

In or about the year 1883, at Hashtnagar, the site of the ancient Pushkalávatí (Peukeloaitis), Mr. King came across a statue of the standing Buddha, which was ignorantly worshipped by the Hindús as an orthodox deity. He could not carry away the statue, but was allowed to remove its inscribed pedestal, a photograph of which is reproduced in Plate X.

The pedestal, like most of the Gándhára sculptures, is composed of blue slate, and is $14\frac{3}{4}''$ long by $8''$ high. Its front is adorned by an alto-rilievo, enclosed between two Indo-Corinthian pilasters, and representing Buddha seated, attended by disciples, who seem to be presenting offerings to him.

An Arian inscription, consisting of a single line of character, deeply and clearly cut, and in great part excellently preserved, occupies a smooth band below the relief. This band was evidently prepared for the inscription, which must have been executed at the same time as the sculpture. The record is incomplete at the end, and the lost portion, which is of very small extent, may have contained the name of the person who dedicated the image.

The extant portion was read by Sir A. Cunningham, for Mr. King, as follows :—

* I have already printed a brief notice of this inscription, accompanied by a lithograph taken from a rubbing, in *Indian Antiquary*, Vol. XVIII, (1889), p. 257. The photograph is now published for the first time.

"*Saṃ* 274 *emborasmasa masasa mi panchami* 5—" The record, as it stands, consists of a date, and nothing more. The month is stated to be intercalary, but is not further named. The numerals are distinct, and their interpretation seems to be free from doubt. The notation is clumsy, and may be rendered thus in Roman numerals, II C XX XX XX X IV, = 274.

The main question suggested by this very scanty record is that of the identity of the era referred to.

The locality in which the inscription was found suggests that the date might be expressed either in the era of Gondophares, as used in the Takht-i-Bahí inscription, or the era of the great king Moga referred to in the Taxila record of Liako Kusulako, or in the era, generally identified with the Śaka era, which was employed by Kanishka. These are the only three eras, in which Arian inscriptions from the Gándhára region are known to be dated, and it is reasonable to assume, in the absence of evidence to the contrary, that the number 274 refers to one or other of these epochs. The initial point of no one of the three has yet been ascertained, and consequently an exact date for the new inscription cannot be fixed in any case. But the approximate beginnings of all three eras can be determined by numismatic evidence, and one of two approximate dates can be selected for the inscription.

The coins indicate that the eras used both by Moga and Gondophares must have their starting points about the middle of the first century B. C., and, so far as appears at present, the two may have been identical. For the purpose of selecting an approximate date for the inscription they may be treated as one, and as equivalent to the era B. C. 57, known to the later ages as the Vikrama Samvat.*

* Assuming that the Mahárája Guduphara of the Takht-i-Bahí inscription is identical with the sovereign whose name is variously given on coins, in the genitive case, as Undopherrou, Gondopharou, Gudapharasa, Gudaphanasa, and Gadapharasa, or, in the nominative case, as Undophares; and assuming further that all the coins alluded to were struck by one king, then the numismatic evidence indicates that he flourished in the first half of the first century B. C. (See *Gardner's Catalogue of the Coins of the Greek and Scythic Kings, pp. XLIV*, 103—108, *Plates XXII, XXIII, XXXII*). The year 103 of Gondophares would therefore fall about the middle of the first century A. D., and, for rough approximations, his era may be regarded as identical with that of Vikrama.

Assuming that Moga of the Taxilan inscription is identical with Maues, who is known from coins, his date must be fixed as about 60 or 70 B. C., which, again, is nearly synchronous with the era of Vikrama (See *Gardner, pp. XXXIII, XLIX.* For the Taxilan inscription see *Cunningham, Archæol. Rep., Vol. II, p.* 132, *Pl. LIX, and Vol. V, p.* 67).

I must not, of course, be understood to suggest that as a matter of fact either Moga or Gondophares used the era afterwards known as the Vikrama Samvat. I use

If then the Hashtnagar inscription is dated in the era either of Moga or Gondophares its approximate date is 274 — 57 = A. D. 214.

Though demonstration that Kanishka used the Śaka era is still wanting, there is no doubt that the era of his inscriptions does not differ, at the most, more than about twenty years from the Śaka, and for the present purpose the era of Kanishka may be taken as identical with the Śaka, A. D. 78. Assuming that this era was used in the Hashtnagar record, its date is A. D. 352. The alternative *approximate* dates, therefore, are A. D. 214 and 352.

The style of the Hashtnagar alto-relievo appears to me to be decidedly inferior to that of most of the Mián Khán, Jamálgaṛhí, Nuttu, and Sanghao sculptures. The figures in it are not undercut, as they are in the best specimens of Græco-Buddhist art, and the execution, on the whole, is poor. So far as I can judge, the work cannot well be older than the middle of the fourth century.

This dubious conclusion is the only assistance given by epigraphic evidence for determining the problem of the age of the Gándhára sculptures.

The numismatic testimony is nearly as scanty and weak as the epigraphic.

The undisturbed hoard of the coins of Azes buried below the Taxila temple with the Ionic pillars indicates, as argued above (p. 115), that that edifice is to be dated from about the beginning of the Christian era, and this inference is in harmony with the reasoning based on considerations of architectural style. It is, as I have already observed, impossible to decide whether the plaster statues found in the Taxilan temple are contemporary with it or not, for no information concerning their style has been published. The coins of Azes found at Taxila, therefore, give no clue to the chronological position of the Gándhára school of sculpture, excepting a few of the earliest works, especially the Pallas, already discussed (p. 121). The only localities, so far as I can ascertain, where coins have been discovered in close association with remains of Græco-Buddhist, or Romano-Buddhist, sculpture, are Jamálgaṛhí and Sanghao.

Lieutenant Crompton in his report on excavations at the former site says nothing about coins beyond the unsatisfactory remark that "a few silver and copper coins were turned up;"* but Sir A. Cunningham

the epoch B. C. 57 merely as a short expression for any era which began somewhere about the middle of the first century B. C., and about which more accurate knowledge is wanting. The Arian inscriptions from the Gándhára country have not yet been properly edited, and the published translations are quoted with reserve.

* *Indian Antiquary*, Vol. III, p. 144.

is a little more explicit, and records that, during the progress of the explorations, eight coins are discovered, seven of which bore the name of Bazo Deo, or Vasu Deva.*

Unfortunately no more particular account of these coins has been published. We do not know either the circumstances of their discovery, or their numismatic type, and consequently can draw no positive inference from the fact that they were found. Coins bearing the name of Bazo Deo or Vasu Deva continued to be struck for a long period, but none of them are earlier than about A. D. 150,† and all we can say is that the discovery of Bazo Deo coins at Jamálgaṛhí is perfectly consistent with the inferences to be drawn from the style of the sculptures found in that locality, even if it be assumed, which is not proved, that the coins are contemporary with the sculptures. The coins, for all that appears to the contrary, may have been struck in the third century.

The only other locality where the discovery of coins can be held to afford evidence for fixing the chronology of Gándhára sculpture is Sanghao. The discovery is reported by Major Cole, a good explorer and photographer, but a bad archæologist, as follows:—

"The site where the sculptures were dug is perched on a steep spur, and was the first excavation done under my superintendence in January, 1883. The building revealed two distinct periods, and consists of a *basement* containing small topes, and of a *superstructure* of plain apartments, built obliquely over the *basement*, apparently without reference to its plan.

"The sculptures were found in the *basement*, and belong to the older period; coins of Kanishka, A. D. 80 to 120, were found in the superstructure, and belong to the more modern period."‡

The Kanishka coins were found along with a brass ring in the so-called 'treasury,' "in earthen ware jars embedded in the floors at the corners A and B," as shown in the plan.§

The sculptures referred to were sent to the Lahore Museum, and form the subject of Plate II of Major Cole's volume of heliogravures.

A coin of Gondophares was also found somewhere in the same group of buildings.|| Gondophares reigned about A. D. 30, but the mere fact that a coin of his was found at Jamálgaṛhí would, at the most, prove

* *Archæol. Rep.*, Vol. V, p. 194. The date assigned to Bazo Deo in this passage is admittedly erroneous.

† Gardner, *Catalogue of Coins of Greek and Scythic Kings*, pp. lii, 159—161 Pl. XXIX.

‡ Cole, *Third Report of the Curator of Ancient Monuments in India*, for the year 1883-84, p. cx.

§ Cole, *Second Report*, for 1882-83, p. cxx, Pl. 3.

|| Cole, *Third Report*, p. cx.

an early occupation of the site. It is no evidence of the date of a particular set of sculptures.

The discovery of coins of Kanishka in the superstructure of the Jamálgarhí monastery, above the basement containing the sculptures, is a much more weighty fact, and undoubtedly seems to warrant Major Cole's inference that the sculptures are earlier than A. D. 100. Nevertheless, I am convinced that the inference is a mistaken one. I fully accept Major Cole's account of what he saw, but it is quite possible that he did not see all that ought to have been observed. He is a strong believer in Sir A. Cunningham's theory of the early date of the Gándhára sculptures, and may, like many other people, have been unconsciously biassed by a prepossession. It is impossible for any one who has not minute local knowledge to check the details of an observation as reported, but, while I cannot pretend to point out the seat of the error, I am fully persuaded that the discovery of the coins in question is not to be explained by the theory that the sculptures photographed are earlier than the reign of Kanishka, but should be interpreted in some other way.

My reasons for thus refusing to accept apparently clear external evidence of date will, I hope, be sufficiently established by the discussion of the internal evidence on which I am about to enter. For the present, it will suffice to say that Major Cole's plate refutes his text. The Sanghao sculptures belong to the same school as those of Nuttu, though they may be a little later, and they bear throughout distinct marks of the influence of Roman art of the third or fourth century. They cannot possibly be anterior to A. D. 100, no matter what coins were found above or below them.

The problem demanding solution may be conveniently stated by placing in juxtaposition and contrast the opinions expressed by the two scholars who have attacked it.

Mr. Fergusson, after giving many reasons, some strong, and some the reverse, for his opinion, came to the conclusion "that, though some of these Gándhára sculptures probably are as early as the first century of the Christian Era, the bulk of them at Jamálgiri, and more especially those at Takht-i-Bahi, are subsequent to the third and fourth [centuries], and that the series extends down to the eighth [century]; till, in fact, the time when Buddhism was obliterated in these countries."*

Sir Alexander Cunningham expresses his views as follows:—

"What I have called the Indo-Grecian style must have been introduced by the Greeks who ruled the country; but the earliest specimens, so far as can be *proved*, belong to the time of Azes, I saw myself twelve

* *Indian and Eastern Architecture*, p. 182.

coins of Azes exhumed from under the temple of *Maliár-kí-mora* (Sháhdheri), from which the Indo-Ionic capitals and bases were extracted.

The Indo-Corinthian examples should be equally old, at least all the fine examples. But the oldest that can be proved, belongs to the time of the Antonines, and is *certainly* older than Constantine."

[Here follow detailed references to the *stúpas* at Mánikyála and elsewhere, and to the use of the Arian alphabet, which has been sufficiently discussed above.]

"I would, therefore, ascribe all the greater works, both of sculpture and architecture, to the *flourishing* period of Kushán sway under Kanishka, Huvishka, and Vasu Deva—, or from 80 to 200 A. D.

Doubtless many *stúpas* were erected after A. D. 200; but they were comparatively small, and their decorations rough and coarse."

[Reference is then made to the Sahri Bahlol image, and the Hidda and Baoti Pind topes, which will be discussed subsequently.]

"I notice that none of the sculptured head-dresses show any affinity with Sassanian costume, whereas the coins (Indo-Sassanian) show it unmistakeably, from about the time of Bahrám Gor. From this I infer that the sculptures are older than 400 A. D.

"I believe that the strong Sassanian government from A. D. 230 to 450 formed a very effectual barrier to intercourse between Rome and N.-W. India. Roman gold coins are plentiful down to the time of Severus and Caracalla [A. D. 217]. They then disappear until the time of Justin [A. D. 526], Marcian [A. D. 450], Leo [A. D. 474], and Anastasius." [A. D. 491-518].*

I am not able to agree altogether with either Mr. Fergusson or Sir A. Cunningham, and shall now proceed to state the reasons which seem to me sufficient to justify me in venturing to differ from such eminent authorities.

It will be convenient to attempt in the first place to fix possible limiting dates, and, when that has been done, to determine, so far as may be, the approximate actual dates of the sculptures. The chronological enquiry involves the determination of their aesthetic affinities.

As to the initial date there is practically no dispute. It is impossible to be certain that "the Indo-Grecian style" was really "introduced

* My quotations are from a letter dated 8th January 1889, with which Sir A. Cunningham favoured me in answer to enquiries, and which consequently, express his latest and deliberate opinion on the subject. In the Introduction to Volume V of the Archæological Reports he had long ago expressed the same opinion as to the relation between the Kushán dynasty and the Gándhára sculptures, but the theory which he then held as to the Kushán chronology obliged him to fix the date of the sculptures nearly a century and a half earlier than he now does.

by the Greeks who ruled the country," as Sir A. Cunningham affirms that it must have been, because, with the exception of coins, not a vestige of Bactrian art is known to exist, and we know nothing almost about the Greeks who ruled the country beyond the names of some of them.

But, whoever introduced Greek art into India, so far as our present knowledge extends, the Taxilan Ionic temples are certainly our oldest specimens of Indo-Greek architecture, and the statuette of Athene, in the same posture in which she is shown on the coins of Azes, is our oldest Indo-Greek sculpture from the Gándhára region. Both the temples and statuette must date approximately from the beginning of the Christian era.

It has been shown above (p. 112) that Greek art influenced Indian sculpture and architectural decoration from the time of Asoka B. C. 250, and that more or less distinct traces of its influence may be traced in the interior of India for several centuries afterwards. Greek ideas reached India by at least two routes, namely, overland through Bactria, and by sea through the ports of the western coast.

The Athene and the Taxilan Ionic pillars are, I think, to be classed among the results of this old and long-continued Hellenistic influence.

The bases of the Ionic pillars at Taxila, according to the measurements of their discoverer, correspond exactly with the pure Attic model, as seen in the Erectheum. "The capitals differ from the usual Greek forms very considerably, and more especially in the extreme height of the abacus. The volutes also differ, but they present the same side views of a baluster, which is common to all the Greek forms of the Ionic order."* In other words, the pillars, though with peculiarities of their own, are Greek, not Roman. The Roman modification of the Ionic order was characterized by corner volutes.

At the beginning of the Christian era Roman art, as will be explained presently, had not affected India, and the fact that the Taxilan Ionic pillars are Greek, not Roman, in style, harmonizes perfectly with the numismatic evidence that they were erected soon after B. C. 30.

So far, then, as the Athene and the Ionic pillars are concerned, it must be admitted that the Gándhára sculptures go back to the beginning of the Christian era, and A. D. 1 may be taken as the anterior limiting date. Nothing older is known in the Gándhára region. I shall endeavour to prove subsequently that nothing else which has been found there is nearly so old.

I shall now try to fix the posterior limiting date, which Mr. Fergus-

* *Archæol. Rep.* Vol. V, p. 71, Pl. XVIII.

son places in the eighth century, and Sir A. Cunningham at the beginning of the fifth.

The extension of the Græco-Buddhist series of sculptures down to the eighth century A. D. by Mr. Fergusson was suggested by the published accounts of the opening of the great tope at Mánikyála many years ago by General Ventura.

The undisturbed deposit which was found in the lower portion of that building included coins of Kanishka and Huvishka, and none later, and is legitimately interpreted as signifying that the structure in its original form cannot be older than A. D. 110, nor much later than A. D. 150.

The upper deposits, about the exact position of which there is some doubt, contained various coins ranging in date from A. D. 632 to about A. D. 730, and undoubtedly show that the top of the building must have been opened in the eighth century, and a deposit then made. But they prove nothing more.

We are altogether ignorant of the circumstances under which these upper deposits were made, and it is very unsafe to build any historical theories on their existence. The great tope at Mánikyála is adorned with Indo-Corinthian pilasters, the existing capitals of which are executed in *kankar*, or nodular limestone. Sir A. Cunningham supposes that all the original work of the tope was in sandstone, and that the *kankar* mouldings date from the eighth century.* No other example of Indo-Corinthian work of that date is known, and, if the existing capitals were executed in the eighth century, I feel certain that they were mere restorations. As a matter of fact their date is quite uncertain. The attempt to connect the coin of Yaśo Varma, A. D. 730, which was found in the upper deposit, with supposed repairs of the tope in the eighth century is purely conjectural.† All we really know is that somebody for some reason unknown opened the building at the top and put in a coin of Yáso Varma. Such an adventitious supplementary deposit is no substantial basis for an argument that Buddhism and Indo-Hellenic art still flourished in the Gándhára region in the eighth century, and, except Yáso Varma's coin, no evidence whatever, so far as I am aware, exists to support the inference that the Gándhára school of art continued to exist so late as the eighth century.

In another place, Mr. Fergusson, still relying on the same poor little coin, has given an unwarrantable extension to the duration

* The great Mánikyála tope is discussed by Cunningham at considerable length in *Archæol Rep.*, Vol. II, p. 139, and Vol. V, pp. 76—78.

† [It is more probable that the coin is of the 6th century, of a Yaśo Varman about 532 A. D. This would admirably fit in with "the limiting date" given on p. 153. See *Proceedings* for August 1888. Ed.]

of Buddhism as a dominant faith in Gándhára. "There were," he writes, "probably no great Buddhist establishments in Gándhára before Kanishka, and as few, if any, after Yáso Varma, yet we learn that between these dates [*i. e.* circa A. D, 78 to 730], this province was as essentially Buddhist as any part of India.*

In support of the last clause of this sentence the Chinese travellers Fa Hian and Hiuen Tsiang are appealed to, but their testimony does not support the conclusion drawn from it. After the middle of the seventh century, when Hiuen Tsiang wrote, very few parts of India were "essentially Buddhist," and Gándhára certainly was not. In A. D. 730 very little Buddhism can have been left in it.

Mr. Fergusson's language is correct when it is confined to the beginning of the fifth century. Fa Hian who travelled in India in the years A. D. 400—405, found Buddhism vigorous and flourishing in Gándhára, as in a large part of India. But, at the time of the travels of Hiuen Tsiang, A. D. 629—642, a very great change had taken place, and Gándhára was very far from being "essentially Buddhist."

The capital city of Gándhára, the modern Pesháwar, is, he notes "about 40 *li* [= 6 to 7 miles] in circuit. The royal family is extinct, and the kingdom is governed by deputies from Kapisa [N. of Kábul]. The town and villages are deserted, and there are but few inhabitants.

At one corner of the royal residence there are about 1,000 families * * * There are about 1,000 *sanghárámas* [monasteries], which are deserted and in ruins. They are filled with wild shrubs, and solitary to the last degree. The *stúpas* are mostly decayed. The heretical temples, to the number of about 100, are occupied pell-mell by heretics."

At Pushkalávatí, the modern Hashtnagar, the pilgrim found a large population, but not of the congregation of the faithful, for the Buddhist buildings, like those of the capital, were in ruins.

Taxila, east of the Indus, was dependent on Káshmír, the royal family here also being extinct. The monasteries are described as "ruinous and deserted, and there are very few priests; those that there are, study the Great Vehicle."†

The graphic and emphatic words of Hiuen Tsiang prove with absolute certainty that at the time of his visits (A. D. 629—642) the Buddhist religion in Gándhára was nearly extinct. The utter decay of which he gives such clear testimony must have been in progress for a considerable time. It is not possible that the Buddhist edifices of Pesháwar could have become "deserted and in ruins, filled with wild shrubs, and solitary to the last degree" in a day.

* *History of Indian and Eastern Architecture*, p. 76.

† Beal, *Buddhist Records of the Western World*, Vol. I, pp. 100, 109, 137.

It is quite safe to assume that Buddhism had ceased to be an active force in the Gándhára region, including Taxila, by the year A. D. 600; and it is inconceivable that new religious edifices on any considerable scale should have been erected, or works of art deserving of the name, executed in that region subsequent to that date by the scattered, poverty-stricken, and necessarily dispirited adherents of a decaying religion.

It follows, therefore, that the series of Græco-Buddhist works in Gándhára does not extend, as Mr. Fergusson supposed, to the eighth century, but, on the contrary, was closed by the end of the sixth century.

As a matter of fact, the closing date must, I believe, be pushed back considerably farther, but in any case, *A. D.* 600 *must be taken as the extreme possible limiting posterior date for any work of the Gándhára school in the Lower Kábul Valley.* The dates of which we are in search lie, therefore, between A. D. 1 and A. D. 600.

The above argument, based on the testimony of Hiuen Tsiang, appears to me unanswerable, but it may be well to supplement it by other arguments, in themselves of less force, which reduce the closing date to still narrower bounds. I have already quoted Sir A Cunningham's remark that the head dresses of the Gándhára sculptures show no affinity with the Sassanian costume, and that the sculptures may therefore be regarded as prior, not only to A. D. 600, but to A. D. 400.

Another observation of Sir A. Cunningham's leads to nearly the same conclusion. He observes that "all, or nearly all, Buddhist building must have been stopped after the occupation of Pesháwar by Kitolo's son in the latter part of the fifth century." The Chinese account show that "the last king of the Yuchi [Yueh-ti] mentioned in history is Kitolo, who took possession of Gándhára, but was obliged to return to the west to oppose the white Huns, leaving his son in charge of the new province. The son established his capital in Fo-lu-she, or Parsháwár [Pesháwar]; and the name of the founder of the Little Yuchi, as they were afterwards called, still survives in the title of Sháh Kator, the Chief of Chitrál."*

The coins of the kings of the Little Yuchi are described as bearing Śaiva emblems,† and the kings themselves, therefore, were presumably Brahmanists. It is going too far to assume with Sir A. Cunningham that the rule of a Śaiva king must necessarily have put a stop to all, or nearly all, Buddhist buildings, but it must certainly have been un-

* My first quotation is from a private letter. The second is from *Archæol. Rep.*, Vol. II, p. 63. I have not verified the reference to Chinese authors, which is not given in detail.

† *Archæol Rep.*, Vol. V, p. 7. I have not seen any of these coins.

favourable to their erection. In another place Sir A. Cunningham speaks of "the first persecution of Buddhism by the Śaiva kings of the Little Yuchi,"* but I do not know what evidence exists for this alleged persecution. Whatever may have been the precise attitude of the Little Yuchi kings towards Buddhism, it is certain that the latter years of the fifth century were times of conflict and turmoil throughout Northern India. The Bhitarí pillar inscription records the struggles between the Gupta dynasty and the Huns (Húṇas), and in or about A. D. 480, on the death of Skanda Gupta, the Gupta empire broke up.† A few years later the stormy career of the Húṇa chief Mihirukula disturbed the whole of Northern India from Bengal to Káshmír.‡ In such a period of anarchy and confused struggles for dominion the arts of peace are perforce neglected, and it would be strange indeed if Gándhára in those days was the scene of the peaceful development of a considerable school of sculpture, as Mr. Fergusson supposed it to have been.

I doubt also if the Græco-Roman impulse retained any considerable force after A. D. 450, even on the north-west frontier. By that time it had certainly spent itself in India Proper, both in the North and West. The last faint traces of Greek skill in design are observable in the Gupta gold coinage of Chandra Gupta II, which was minted in Northern India about A. D. 400,—the later Hindú coinage is all barbarous in style. Corrupt and unmeaning Greek letters linger on the silver coins of Kumára Gupta and Skanda Gupta struck in Western India up to about A. D. 480, but the fact that these letters are corrupt and unmeaning shows that Hellenistic culture had then dwindled down to a dead tradition, even in Gujarát, which had been for centuries in communication with Alexandria and Rome.

In short, all that is known of early Indian history indicates the great improbability of the existence of a flourishing Hellenistic school of sculpture on the north-west frontier later than A. D. 450.

Before proceeding to the discussion of the artistic relations of the Gándhára sculptures, which will render the chronology more definite, one other piece of external evidence may be cited to prove that the good sculptures are much earlier than A. D. 600.

* *Archæol. Rep.*, Vol V, p. 42.

† [See, however, on the dissolution of the Gupta empire, the paper *On an Inscribed seal of Kumára Gupta, ante*, p. 85. Ed.]

‡ For the history of the Gupta period see Mr. Fleet's work on the Gupta inscriptions, Vol. III. of the *Corpus Inscriptionum Indicarum*. I have given a very brief outline of it in my essay on the Gupta Coinage in the *Journal Royal Asiatic Society* for January 1889, to which reference may be made for the proof of the remarks in the next paragraph.

A statuette, Indo-Greek or Indo-Roman in style, wanting the hands and feet, was discovered by Dr. Bellew in the Gándhára country, carefully enclosed in a sepulchral chamber at the level of the ground in the centre of a *stúpa*. The statuette represents the standing Buddha, and is characterized by Dr. Bellew as "better carved than the generality of figures met with," and by Sir A. Cuuningham as "fine."*

The style of the statuette shows that it was executed during the flourishing period of the Gándhára school, and its mutilated condition proves that it was already old when deposited in the *stúpa*. The form of that building indicates that it was created not later than A. D. 600, nor much earlier than A. D. 500.

It is thus evident, remarks Sir A. Cunningham, that the statuette was utilized at a time "when the zeal of first converts had long since died away, and the growing indifference of the people no longer required the manufacture of new statues. Under such circumstances, I can readily suppose that that the builders of the tope may have deposited any piece of Buddhist sculpture that came to hand, just as Bráhmans at the present day will set up and worship any statue which may be found, caring little for its state of mutilation, and still less for its possible connexion with Jainism or Buddhism."

This curious discovery thus confirms the evidence already adduced to prove the propositions that the period A. D. 500—600 was one of decay for Buddhism in Gándhára, that few new religious edifices were erected doing that period, though their construction did not altogether cease, and that the vigorous, local school of Indo-Hellenic art belongs to an earlier time.

My contention that the history of the Gándhára school of Indo-Hellenic art, consecrated to the service of Buddhism, was practically at an end by A. D. 450, may be met by the observation that Buddhist monuments of later date are known to exist in the upper Kábul Valley and elsewhere in the neighbouring countries.

One of the latest *stúpas*, to which a date at all definite can be assigned, is that known as No. 10, at Hidda near Jalálábád. This building contained a deposit of coins consisting of five gold *solidi* of the Byzantine emperors Theodosius, Marcian and Leo (A. D. 407—474), two very debased imitations of the Indo-Scythian coinage, which may be assigned to the sixth century, and no less than 202 Sassanian coins of various reigns, but all agreeing in the absence of any trace of Muhammadan influence.

Masson and Wilson, arguing from these facts, reasonably came to

* Cunningham, *Descriptive List*, No. 165; and *Archæol. Rep.* Vol. V, p. 42, with quotations from Dr. Bellew's Report on Yúsufzai, the original of which I have not seen.

the conclusion that the *stúpa* must have been constructed between the years A. D. 474 and 690, at which latter date the Muhammadan incursions had begun, and Kábul was governed by Bráhman kings.*

The Sassanian coins indicate that the monument was erected about A. D. 600.

A *stúpa* belonging to approximately the same period, with an undisturbed deposit of coins, was opened by Sir A. Cunningham at Baoti Pind in the Ráwal-Pindi District, east of the Indus.†

No *stúpa* of later date than those at Hidda and Baoti Pind is, I believe, known either in Afghánistán or the Panjáb, though I should be sorry to affirm that none such exist.

These examples prove, as we had already learned from Hiuen Tsiang, that Buddhism, though sadly weakened at the beginning of the seventh century, was still alive, and show, which was hardly to be expected, that occasionally persons could still be found willing to spend much time and money on works dedicated to the religion of Buddha.

But these examples prove nothing in favour of the late continuance of the Gándhára school of sculpture.

I do not think that any Indo-Hellenic sculpture was found associated with the ruins of the Baoti Pind *stúpa*. The published information concerning the architectural and sculptured decorations of the *stúpas* near Jalálábád is very meagre. So far as it goes, it indicates that, whatever may be the reason of the difference, the monuments in the upper Kábul valley do not display such manifest traces of Græco-Roman influence as do those situate in the lower Kábul valley or Gándhára. Wilson speaks more than once of "plain mouldings" on the pilasters, and does not, I think, note any example of the Indo-Corinthian capital among the ruins of the Jalálábád topes. The date of these topes has, consequently, little bearing on the question concerning the chronology of the Gándhára sculptures.

It is probable that these sculptures are the work of a special local school, working on the lines of Roman art under the patronage of the sovereigns who resided at the city now known as Pesháwar. It seems clear that the head quarters of the school were at Pesháwar, and that the special modification of Roman art, worked out by the artists of that city, never spread beyond the bounds of a comparatively small region in the vicinity of the capital. The connection between the Pesháwar school and the architects and sculptors of interior India was, I believe, very slight, if it existed at all.

I have ventured to assert positively that the Gándhára or Pesháwar

* *Ariana Antiqua*, pp. 44, 110, Pl, XVI, XVIII.

† *Archæol. Rep.*, Vol. II, p. 141.

local school of sculpture followed the lines of Roman art, and is not the direct descendant of pure Greek art. This proposition of course is to be taken strictly as applying only to the Pesháwar school. It does not apply to the case of the Ionic pillars at Taxila, nor to the sculptures at Buddha Gayá or Bhárhut. The Sánchi work too is probably free from Roman influence, and I cannot perceive any very clear traces of such influence at Amarávatí, though I am not certain that it is altogether absent. The art work in some of the caves in Western India, on the other hand, was in all probability influenced by the specially Roman developments of Greek art.

I pass by on the present occasion the wider questions suggested by an examination of the entire field of early Indian art, and confine myself to the discussion of the nature and degree of Roman influence on the local Gándhára or Pesháwar school of sculpture, which is specially characterized by the use for decorative purposes of the Indo-Corinthian capital.

A brief outline of some of the most material facts in the history of the intercourse between Rome and India will help my readers to appreciate more accurately the value of comparisons between Indian and Roman works, and to understand the bearing of such comparisons on the chronology of the Gándhára school.

Roman influence was not felt by India until after the establishment of the empire of the Cæsars, and the subjugation of Egypt by Augustus; and even during the reign of Augustus, the maritime commerce between Rome and India appears to have been conducted by Arab ships.

The discovery or re-discovery of the course of the monsoon by Hippalos, about the middle of the first century A. D., first rendered it possible for Roman ships to reach the Indian shores.

The overland trade between India and the Roman empire appears to have first attained large dimensions at about the same time. Pliny, who died A. D. 79, laments, in a well-known and often quoted passage, the heavy drain of gold from the capital towards the east, and his evidence is confirmed by the large number of coins of the early Roman empire which have been found in India.

The overthrow of the Nabatæan kingdom of Petra in A. D. 105 secured for Palymra the commercial preeminence on the principal land route between the Roman empire on one side and India and China on the other, and that city retained the preeminence thus gained until it was sacked by Aurelian in A. D. 273. Palymra was visited by the emperor Hadrian about the year A. D. 130, and about A. D. 200, in the reign either of Septimus Severus, or of his son Caracalla, was made a Roman colony.

Active communication between the Roman empire and the far east was maintained during the third century, not only by the peaceful methods of commerce, but by the frequent oriental expeditions of the emperors. The disastrous war of Valerian with the king of Persia, A. D. 254—260, brought the armies of Rome into almost direct contact with India.

The period of Palmyra's commercial greatness, A. D. 105—273, coincided with the period of Roman military activity in the east, and in part with the prosperity of Alexandria, the emporium of the Indian sea-borne trade. This period, accordingly, is that during which Roman intercourse with India attained its maximum. "It was during the reigns of Severus [A. D. 194—211], his son Caracalla [A. D. 211—217], and the Pseudo-Antonines that Alexandria and Palmyra were most prosperous, and that Roman intercourse with India attained its height. The Roman literature gave more of its attention to Indian matters, and did not, as of old, confine itself to quotations from the historians of Alexander, or the narratives of the Seleucidan ambassadors, but drew its information from other and independent sources."

The existence of such independent sources of information is apparent from the works of Clemens Alexandrinus, (who mentions Buddha and *stúpas*), Philostratus, Ælian, and other writers.*

It so happened that at the date, A. D. 273, of the cruel destruction of Palmyra, Alexandria too had fallen into comparative decay. "It would," of course, as Priaulx observes, "be absurd to suppose that the destruction of Palmyra, however much it affected, put an end to the Indian trade through the Persian Gulf." The trade continued, and part of it passed for a time to Batné near the Euphrates, a day's journey from Edessa.† But the Indo-Roman trade, though not stopped, was necessarily very much diminished in volume by the destruction of its overland, and the decay of its maritime emporium, and the intercourse between Rome and the far east became much more difficult and intermittent than it had been for about two centuries previously.

The Alexandrian trade about this time seems to have been abandoned by Roman ships, and to have depended on Arab vessels, as in the days of Augustus. In the reign of Constantine (A. D. 306—337) commerce with the east revived, but the Roman ships seem to have rarely, if ever, ventured, beyond the Arabian Gulf of the Red Sea.

* Priaulx, *Apollonius of Tyana and Indian Embassies to Rome*, pp. 132, *seqq.* My remarks on the course of Roman trade with India are chiefly drawn from this valuable little book and Prof. Robertson Smith's article on Palymra, in the ninth edition of the Encyclopædia Britannica.

† Priaulx, *Apollonius of Tyana*, etc., pp. 178, 233.

The known facts of the external relations between the Roman empire and India, therefore, apart from all æsthetic criticism, suggest that, if Indian art was influenced by Roman art, the influence would have been most active during the period which may be defined, in round numbers, as extending from A. D. 100 to 350. It would hardly be reasonable to expect that the partial interruption of intercourse between A. D. 273 and 306 should be traceable in Indian art history, and it is not traceable.

I have named A. D. 100 as the approximate earliest possible anterior limit for Roman influence on Indian art, but, as a matter of fact, that date is too early. The name of Rome must of course have been long known to a greater or less extent in India, but I doubt if the Oriental would know much about the Roman empire, before the reign of Hadrian (A. D. 117—138), whose expeditions to Syria (*circa* A. D. 130), and passion for building great edifices must have spread the fame of his power among the merchants of the east. I consider it improbable that Roman models could have affected Indian art before A. D. 150. On the other hand, Roman influence continued to be felt by the arts of India after A. D. 350, and may not have completely disappeared for a century later.

The ground has now been cleared for an examination in some detail of the Roman elements in the art of the Gándhára or Pesháwar school. The general aspect of the figure sculptures and architectural decorations of that school is, as Mr. Fergusson perceived, distinctly Roman, but a vague assertion to that effect cannot convince anybody who has not acquired some familiarity with the art both of Rome and Gándhára. Detailed proofs are necessary to carry conviction to the mind of the ordinary reader. I shall now proceed to give some.

"Roman architecture, as we know it, dates only from about the Christian era, and the rapidity with which it spread from that time is something marvellous. Through nearly the whole extent of the Roman empire, through Asia Minor, Sicily, Britain, France, Syria, Africa,—with one great exception, Egypt,—all was Roman in moulding, ornament, details, the very style of carving, and the construction. No matter what the country of the architect, all seem to have lost their nationality when the Roman came, and to have adopted implicitly his system of design and decoration.....

"It is not uncommon to find examples of Roman architecture completely overdone with ornament, every moulding carved, and every straight surface, whether vertical or horizontal, sculptured with foliage or characteristic subjects in relief."*

* Lewis and Street, article Architecture in Encyclopædia Britannica, 9th edition, pp. 418, 421.

To the list of countries above enumerated as having adopted the Roman system of design and decoration, the Lower Kábul Valley, though it never formed part of the Roman empire, must be added.

So far as I understand the published plans and elevations, the Gándhára buildings show little Roman influence in their construction, though I should not venture to affirm that careful study might not reveal the existence of Roman elements in their plan and construction. However this may be, these buildings, like those of the provinces of the empire, were "Roman in moulding, ornament, details, and the very style of carving," and were characterized, like better known examples of Roman work, by excess of ornament, and by the lavish use for decorative purposes of crowded realistic compositions in high and low relief.

Almost every frieze or panel from Gándhára is decorated with florid Corinthian pilasters, and numerous fragments of similar Corinthian capitals belonging to structural pillars have been found. No one can give the most cursory glance at a collection of Gándhára sculptures without being struck by the free employment of the Corinthian capital as an ornament. No other Græco-Roman form of capital is used, though for a time the Indo-Persian form continued to dispute the field with its newly introduced rival.

Such extensive and exclusive use of the Corinthian form of pillar is in itself decisive proof that the school characterized by it was dominated by Roman influence, and was not a direct descendant of Greek art.

The case of Palmyra offers an exact parallel to what we see in Gándhára. "It is remarkable," observes Wood, "that, except four Ionic half-columns in the temple of the sun, and two in one of the mausoleums, the whole is Corinthian, richly ornamented, with some striking beauties, and some as visible faults."*

We find the same state of facts at the other great Syrian city of Baalbec, or Heliopolis, "which, so far as it has been known to modern travellers, is a Roman city of the second century A. D. The Corinthian order of architecture—the favourite order of the Romans—prevails with few exceptions in its edifices. A Doric column, the supposed clepsydra, is, indeed, mentioned by Wood and Dawkins, and the Ionic style is found in the interior of the circular temple;" but all else is Corinthian.

The style of the great temples at Palmyra is later and more debased than that of the corresponding edifices at Baalbec. No building of importance was erected at Palmyra after the sack of the city by Aurelian in A. D. 273, and the temples may be referred to the third century A. D.,

* Wood, *Palmyra*, p. 15.

having probably been erected during the reigns of Odænathus and Zenobia (A. D. 260—273.)

During the period A. D. 105—273 Palmyra was the principal depôt of the overland trade between India and the west, and the caravans which were constantly passing and re-passing through it must have affected some exchange of ideas as well as of more material wares. It is, therefore, reasonable to believe that the example of Palmyra was one of the factors which influenced the Gándhára architects and sculptors in their adoption of the universally diffused Corinthian style.*

The peculiarities of the Indo-Corinthian pillars have been briefly described in a previous page (pp. 117, 118).

Sir A. Cunningham holds that "at least all the fine examples" of the Indo-Corinthian style, such as the capitals found at Jamálgaṛhí, which are the finest known, should be ascribed to the same age as the temples with Ionic pillars at Taxila.

This view appears to me altogether erroneous, and inconsistent with the observed facts. The Taxilan temples date from the beginning of the Christian era, and show no trace of the domination of Roman ideas of art.

The Indo-Corinthian remains, on the other hand, bear on their face the most obvious resemblance to Roman work, and must consequently be later than the time when India and Rome came into contact. On historical grounds I have fixed the approximate date at which Roman forms of architectural decoration reached India as not earlier than A. D. 150, and an examination of the Indo-Corinthian works fully confirms this inference drawn from the known facts of external history.

It is, I venture to affirm, impossible that a florid adaptation of the Corinthian order, such as is universally employed in the buildings of Gándhára Proper, could have attained such favour except under Roman influence.

Pure Greek examples of the Corinthian order are extremely rare, while Roman examples are numbered by thousands. The Corinthian pillar, modified so freely, that no two specimens exactly agree, was the favourite architectural decoration employed by the builders of imperial Rome, and by those of the subject provinces, who followed the fashion set at the seat of government.

I think I am perfectly accurate in asserting that Corinthian capitals, at all like those at Jamálgaṛhí, were not produced anywhere in the world as early as the beginning of the Christian era, whereas plenty of capitals,

* Prof. Robertson Smith's articles in the Encyclopædia Britannica, 9th edition, give excellent summaries of the present state of knowledge respecting Palmyra and Baalbec.

very like these, though differing in detail, were executed in various parts of the Roman world during the third and fourth centuries.

The fact, (according to Sir A. Cunningham's measurements), that the only two Indo-Corinthian bases of columns yet discovered do not differ widely from the bases of the pillars in the Choragic monument of Lysicrates, which was erected in B. C. 334, does not render credible the supposition that capitals similar to Roman work of the Antonine period were executed at the beginning of the Christian era.

Mr. Fergusson described the Jamálgaṛhí capitals as being "more Greek than Roman in the character of their foliage, but more Roman than Greek in the form of their volutes and general design. Perhaps," he added, "it would be correct to say they are more Byzantine than either, but, till we have detailed drawings, and know more of their surroundings, it is difficult to give a positive opinion as to their age."*

The great critic, with the imperfect materials at his command, might have felt a difficulty in deciding whether a given specimen was to be dated from A. D. 200 or 400, but he had no difficulty in seeing the strong Roman element which exists in all the specimens. Mr. Freeman has more than once called attention to the remarkable circumstance that human figures are inserted among the acanthus foliage of the Corinthian capitals in the ruins of the Baths of Caracalla at Rome.

"The artist," he observes, "has been so far from confining himself to one prescribed pattern, either of volutes or acanthus leaves, that he has ventured to employ vigorously carved *human* or *divine figures* as parts of the enrichment of his capitals."†

Similar figures, employed just in the same way, occur in some of the Indo-Corinthian capitals from Jamálgaṛhí, and are described by their discoverer as follows :—

"The human figures, which are introduced in the spaces between the acanthus leaves, are all small, and do not interfere in the least degree with the treatment of the foliage. When there is only one figure, it is always that of Buddha, either sitting or standing, and, when there are three figures, the middle one is of Buddha, and the others are attendant Arhans. These figures are never obtrusive, and they are always so placed that, to my eye, they harmonize most agreeably with the surrounding and overhanging foliage."‡

* *History of Indian and Eastern Architecture*, p. 174.

† The quotation is copied from Cunningham, *Archæol Rep.*, Vol. V, p. 193, where the original is said to be in an essay by Mr Freeman published in Macmillan's Magazine; but no exact reference is given. Mr. Freeman alludes briefly to the subject in his separately published essays on Italian architecture.

‡ Cunningham, *Archæol Rep.*, Vol, V, p. 193. On the same page the author makes an unfortunate slip, and places Caracalla "in the beginning of the first century

Whatever be the æsthetic merits or demerits of the practice of introducing human figures into the Corinthian capital, it was a Roman practice. No one will contend that the capitals in the Baths of Caracalla are imitations of those in the Gándhára monasteries. It follows that the Gándhára capitals are imitated either from those in the Baths of Caracalla, or others of similar design of the same period. The reign of Caracalla extended from A. D. 211 to 217; and the necessary inference is that the Jamálgaṛhí capitals with human figures are later than A. D. 217.

This inference as to the date of the Jamálgaṛhí sculptures derived from the character of the capitals is in complete accordance with the conclusions deducible from an examination of the style of the sculptures in relief.

Before quitting the topic of the Indo-Corinthian capitals, it is only just that I should complete the account of Mr. Fergusson's views as to their date. He argues that their form argues a date later than the reign of Constantine (A. D. 306—337), after which time "the design of the capitals went wild, if the expression may be used. The practice of springing arches from them, instead of supporting horizontal architraves, required a total change, and in the West it produced exactly the same effects that we find in Gándhára.* The capitals for instance, in the churches of St. Demetrius and that now known as the Eski Jouma of Jouma at Salonica, both built in the early part of the 5th century, are almost identical in design with these, and many of the churches in Asia Minor and Syria show the same 'abandon' in design, through frequently in another direction."

I have no doubt that Mr. Fergusson is right in comparing the Gándhára capitals with those of the two Syrian churches belonging to the early part of the fifth century which he names, and that a general resemblance exists between the objects compared. Such a general resemblance is quite natural, even if there be an interval of fifty or a hundred years between the Syrian and the Indian pillars. But, if Mr. Fergusson intended to suggest that the Jamálgaṛhí pillars were exe-

of the Christian era," and thence argues for the early date of the sculptures. Mr. Fergusson, in correcting this accidental error, allowed himself to fall into a similar one, and dated the baths of Caracalla in the reign of Constantine.

* *Indian and Eastern Architecture*, p. 178, with references to Texier and Pullan's Byzantine Architecture, and De Vogüé's Syrie Centrale. The Syrian pillars figured by De Vogüé display certainly a great 'abandon' of design, but they have no resemblance whatever to the Gándhára forms. I except, of course, the comparatively regular Corinthian capitals at Palmyra and Baalbec, which are not much dissimilar from the Gándhára varieties.

cuted subsequent to the reign of Constantine, I cannot agree with him. They belong rather to the Antonine period, and may be referred with approximate correctness to A. D. 250, the Indian development being necessarily a little later than its Roman original.

I do not know whether true structural arches, carried on Corinthian pillars, were employed in the construction of the Gándhára monasteries or not, but it is probable that they were; for the reliefs show numerous examples of arches carried on such pillars, and used as decoration.

Mr. Fergusson's hint that it would perhaps be more accurate to call the Indo-Corinthian capitals Byzantine than either Greek or Roman does not seem to me a fruitful one. The term Byzantine may, of course, be used with reference to any Roman art of the fourth century,* to which period some of the Gándhára sculptures must be referred, but it generally connotes the formal, hieratic, and long stationary style of later date. The good Gándhára works do not seem to me to be characterized by the hieratic stiffness which is the special note of Byzantine art, although some of them are closely related to works executed in the reign of Constantine; and when the school began to decay, the art of Gándhára passed, not into Byzantine formalism, but into Hindú barbarism.

When Mr. Fergusson wrote, the erroneous date which he assumed for the Amarávatí rails, and the inferences which he drew from the discovery of the coin of Yaśo Varman in the great tope at Mánikyálá predisposed him to assign an unduly late date to the Gándhára school.

Mr. Fergusson rightly observed that some of the Gándhára sculptures might be mistaken for early Christian works, but he did not follow out the hint thus given, and the remark, though perfectly true, has not attracted much attention. He supported the observation by a cursory reference to the early Christian sarcophagi and ivories. I have examined the fine collection of ivories, original and casts, in the South Kensington Museum, and, while admitting that some have really an artistic relation with the Gándhára work, I venture to think that the relation is not very close.

The representation of Christ standing under a small arch, supported on fluted columns, with florid capitals of a modified Corinthian form, as seen on the front of the Brescia casket, dating from the fifth or sixth century, is undoubtedly akin to the Gándhára representations of Buddha; and the procession of Joseph and his brethren on the Ravenna chair recalls, though less vividly, some of the processional scenes of the

* Constantinople was formally consecrated as the New Rome in A. D. 330.

Indian reliefs.* But the ivories do not seem to me to be exactly contemporary with the Indian work.

The closest parallels to the Gándhára sculptures in relief are to be found among the remains of early Christian art, though not among the ivory carvings. These parallels are to be found in a place where we should hardly expect them, the Catacombs of Rome.

It would be impossible by any number of pages of mere description to bring home to the reader's mind the reality of the likeness here asserted, but a comparison of the heliogravure plates of the Gándhára sculptures edited by Major Cole with the similar plates of the sculptures in the Catacombs in Roller's work will convince any one who takes the trouble to make it that the connection between the two, however it came to pass, is very close indeed.†

I shall merely give references to the plates in M. Roller's book which closely resemble Major Cole's.

*Pl. XLII.* A sarcophagus, "à demi-païen, à demi-chrétien," from the cemetery of Callixtus, and probably dating from the third century. The arrangement of the whole composition much resembles that of many of the Gándhára reliefs, and the posture of the figure of Psyche is nearly identical with that of Prajápatí in the Nativity group from the upper monastery at Nuttu, described *ante*, p. 124.

*Pl. XLIV.* Sarcophagus of St. Constantia, with vintage scenes and genii; 4th century.

*Pl. XLV.* Sarcophagus from the Basilica of St. Paul, with various scenes of the life of Christ and His disciples, sculptured in high relief; 4th century. The scenes in this composition are not separated by columns. The resemblance in general effect to some of the best Gándhára sculptures is very strong.

* Westwood, *Descriptive Catalogue of the Fictile Ivories in the South Kensington Museum* (1876), Pl. II, III. Compare the large Catalogue of Original Ivories in the same Museum by Maskell (1872), and the little hand-book by the same writer, entitled *Ivories, Ancient and Mediæval.* Other references are given by Fergusson in *I. and E. Architecture*, p. 182.

† *Les Catacombes de Rome, Histoire de l' Art et des Croyances Religieuses pendant les premiers Siècles du Christianisme*, par Théophile Roller, Paris, Vve. A. Morel et Cie.; 2 vols. large folio n. d., with 100 heliogravure plates. Readers who cannot obtain access to this work or De Rossi's publications may verify the comparison made by reference to "*Roma Sotterranea, or an Account of the Roman Catacombs especially of the Cemetery of St. Callixtus;* compiled from the works of Commendatore De Rossi, with the consent of the author. New edition, rewritten and greatly enlarged, by Rev. J. Spencer Northcote, D. D., Canon of Birmingham, and Rev. W. R. Brownlow, M. A., Canon of Plymouth;" 2 volumes, 8vo., London, Longman's, Green and Co., 1879, with numerous engravings.

*Pl. XLVIII.* Resurrection of Lazarus, and other incidents ; 4th, or possibly, 5th century. The thick, stumpy figures much resemble some of those in reliefs from Nuttu and Sanghao.

*Pl. XLIX.* Sarcophagus of 4th or 5th century, with a long row of worshippers.

*Pl. LIV.* Representation of an *agapé* feast; 5th century. The winged genii and other figures much resemble those seen in Gándhára art.

*Pl. LVIII.* Sarcophagus of Constantine in the Lateran Museum; 4th century. Relief sculptures with intercolumniations and architrave. Christ is seated in the centre compartment, like Buddha in the Gándhára compositions.

*Pl. LIX.* The celebrated sarcophagus of Junius Bassus, dated A. D. 359. Various scenes are represented in panels divided by columns. The style is very similar to that of good Gándhára work.

*Pl. LX.* Five sarcophagi of the 4th century ; various subjects.

*Pl. LXVIII.* Adoration of the magi; 4th century, compare the Gándhára representation of the four kings offering the precious bowls to Buddha. One example of this is in the Lahore Museum, No. 405 of Cunningham's *Descriptive List*, and another, (or possibly the same work), is figured by Major Cole.

*Pl. LXIX.* The Epiphany ; 4th century.

*Pl. LXXVI.* Elijah ascending to heaven in a four-horsed chariot ; 4th, or possibly 3rd, century.

*Pl. LXXXI.* Sarcophagus, probably of about 5th century.

*Pl. LXXXII.* Sarcophagus of 5th century.

*Pl. LXXXVII.* Worship of the *labarum* symbol, the cross enclosed in a circle, elevated in the centre compartment of an intercolumniated relief ; 5th century.

This composition has a very strong resemblance to the representation of the worship of the *Trisúl*, the emblem of the Buddhist faith, in Major Cole's volume.

It is, as I have said, impossible by means of mere verbal description to express the intimate relation which exists between the art of Gándhára, and these Christian sculptures from the Catacombs, which range in date from about A. D. 250 to 450 ; but it is equally impossible for any person to compare photographs of the two sets of objects, and to fail in perceiving the likeness, in some cases almost amounting to identity, of style and treatment. The evident analogy, too, between the representations of the Buddha and the Christ shows that there is a substantial identity of subject, veiled under difference of name, as well as in treatment. The facts invite speculation as to the possibility and probability

of an appreciable amount of Christian influence on the later development of Buddhism, but I cannot venture at present to embark on the tempting, though perilous, sea of conjecture to which such speculation would lead me.

I have shown above that no difficulty exists in supposing that Indian art may have been affected by the Palmyrene variety of the cosmopolitan Roman style. Inasmuch as that style was cosmopolitan, it is impossible to say that any given Indian adaptation of a Roman model was borrowed from the art of Palmyra or any other particular locality. If we find an Indian sculpture nearly identical with one at Palmyra, all that can be safely asserted is, that both have a common origin, and date from approximately the one period, while there is no reason why the Indian imitation should not have been copied directly from a Palmyrene model.

Bearing in mind these explanations, it is interesting to observe that a frieze from the upper monastery at Nuttu, reproduced in Major Cole's Plate 16, figure 1, is substantially identical with the Palmyrene frieze engraved in Wood's Plate 41.

The latter adorns a building which bears an inscription recording the execution of repairs during the reign of Diocletian (A. D. 284—305), who kept a garrison at Palmyra, but the building, and the frieze with which it is decorated, probably were erected about the middle of the third century.

The Nuttu design consists of a vine stem, knotted into five circles, forming small panels; the first of which, to the left, contains leaves only, the second is occupied by a boy or Genius plucking grapes, the third exhibits two boys playing with a goat, the fourth displays a rudely executed goat sitting up and nibbling the vine, and the fifth represents a boy plucking grapes.

At Palmyra, the figures of the boys and goats are wanting, but the design of the knotted vine is absolutely identical with that in the frieze from Nuttu, and the two works cannot be far apart in date. Somewhat similar scroll patterns are common in Roman art, and occur occasionally in other works of the Gándhára school.

The porphyry sarcophagus of St. Constantia, executed in the reign of Constantine (A. D. 306—337), to which I have already referred (*ante*, p. 165), is adorned with a relief exhibiting the pressing of grapes by winged cupids, set in scrolls of vine-stems, bearing a general resemblance to the design of the Nuttu frieze. The subsidiary garland, acanthus leaf, and animal decorations of St. Constantia's sarcophagus all have a strong likeness to the Nuttu sculptures and other works of the Gándhára school.

I venture to maintain with some confidence that I cannot be far wrong in assuming A. D. 300 as an approximate mean date for the remains of the upper monastery at Nuttu. This chronological determination is of special value because the sculptures from this site, though extremely various in subject, are probably all contemporaneous, or nearly so. The whole site occupied an area measuring only about 80 by 60 feet, and 79 objects were found within this small space. Most of these are stone sculptures, which lay round two small *stúpas*, each ten feet in diameter, that occupied the centre of the building. Fragments of plaster figures were found at a distance of a few feet from the miniature *stúpas*.*

The varied collection of sculptures obtained within this small space comprises the Nativity scene, (*ante*, p. 123), the very elegant figure of a woman standing under a conventional palm-tree, (*ante*, p. 124), a specimen of the adaptation of the Rape of Ganymede, (*ante*, p. 134), two examples of the death-bed scene or *parinirváṇa*, (*ante*, p. 125), and numerous figures of Buddha associated with his disciples, the master being sometimes represented with both shoulders draped, and wearing moustaches, (*ante*, p. 127).

It seems reasonable to suppose that sculptures obtained within such a very limited area, and belonging to one school of art, cannot be very widely separated from one another in date. It is not likely that they were all executed in a single year, but, for the purposes of art history, they may be safely regarded as contemporaneous.

If then I am right in fixing A. D. 300 as the approximate date for this group of subjects, a valuable standard for the chronology of the whole school has been rendered available, and we learn that, at the date specified, all the subjects named had been adopted by Buddhist artists as proper themes for the exercise of their skill.

I cannot attempt to indicate every instance in which the art of Gándhára appears to be an echo of that of imperial Rome, and shall quote but few more such instances. The representation of a long roll or undulated garland carried by boys is one of the commonest subjects treated in the Gándhára friezes. A specimen is thus described by Dr. Anderson;—"G. 94, *a* to *d*.—Four portions of a frieze. Children supporting on their shoulders a long undulated garland, on which are tied bunches of grapes, and other ornaments; in the drooping folds above which, in some, appear the busts and heads of winged human figures, and, in one, a bird of prey with extended wings, while, in others, the intervals are filled with floral devices."†

* Cole, *Second Report*, p. cxxiii, Pl. 6 (plan and elevation).

† Anderson's *Catalogue*, Part I, p. 241. Cf. Cole's heliogravure plate 7, figures 2, 3.

Numerous illustrations might be quoted in proof of the proposition that designs of this class are Roman in origin, but I shall content myself with referring to one, a frieze found in the Palestrina territory, probably dating from the time of Constantine, which represents a very large garland carried by boys.*

The same subject occurs repeatedly in the sculptures of Amarávatí, though treated in more Indian style. A notable distinction between the methods of treatment in Gándhára and at Amarávatí is that the Gándhára artists always give the roll an imbricated surface, such as is commonly seen in Roman art, whereas the Amarávatí sculptors mark the surface with lines in a manner of their own. But I suspect that at Amarávatí, as well as in Gándhára, the motive was borrowed from Roman art.

The Buddhist artists, following the usual Indian practice, converted the foreign motive to the purposes of their own ceremonial, and, as Sir A. Cunningham has pointed out, used the Roman garland to represent the light serpentine frame of bamboo covered with tinsel, which was carried in procession at Buddhist festivals, as it is to this day in Burma.

I have already referred to the fact that the conventional representation of the *parinirvána* or death-bed of Buddha is borrowed from the sculptures of Roman sarcophagi or Græco-Roman sepulchral reliefs (*ante*, p. 126).

I have also mentioned (*ante*, p. 136) that the representations of winged animals, and marine monsters, and the comic friezes of boys riding on lions and other beasts, so common in the early Buddhist sculptures both of Gándhára and India Proper, are ultimately derived from the works of the Alexandrian schools of Greek art, which are supposed to trace their parentage to Scopas.

The early examples of this class of subjects which occur in the interior of India, and are prior in date to the establishment of the Roman empire, must be imitations of Greek models. In all probability the artists of Buddha Gayá and Bhárhut obtained their knowledge of these foreign forms by means of the sea commerce conducted with Alexandria through the inland depot of Ozene (Ujjain), and the port of Barygaza (Bharoch).† At Amarávatí it is possible that the channel of communication was Roman.

The Gándhára compositions dealing with similar subjects should be compared, not with Greek art, but with the representations of the

* Visconti, *Museo Pio-Clementino*, Vol. VII, pl. XXXV.

† See the Introduction to McCrindle's translation of the Periplus of the Erythræan Sea.

Triumph of Bacchus, and of processions of the Genii Bacchici and Genii Circenses, many examples of which may be seen in Visconti's plates, and in other illustrated works on Roman art.

It is not easy to determine the chronological sequence of the various remains in the Yúsufzai country.

"The principal groups of ruins," remarks Sir A. Cunningham, "are at Sháhbázgaṛhi, Sáwaldher, and Sahri Bahlol in the plain; and at Ránígat, Jamalgaṛhi, Takht-i-Bahi, and Kharkai in the hills. There are similar remains at many other places, as at Topi, Ohind, and Zeda in Utmanzai; at Túrli, Baksháli, and Gharyáli in Súdam; and at Matta and Sanghao in Lúnkhor."*

To this list must be added the ruins of the monasteries at Mián Khán and Nuttu, which lie close to those at Sanghao, and were explored by Major Cole.

The buildings and sculptures of Jamálgaṛhí were the first described, and are the best known. It is very unfortunate that no accurate record has been kept in many cases of the exact site where certain sculptures were found, and the consequent uncertainty greatly hinders satisfactory discussion. But it is certain that by far the largest proportion of the specimens of Gándhára art in the Indian Museum at Calcutta came from Jamálgaṛhí, and that some of the best specimens in the British Museum came from the same locality. The Gándhára school was in its prime when the Jamálgaṛhí sculptures were executed. I have shown (*ante*, p. 163) that the Indo-Corinthian capitals found there are later than A D. 217. So far as I can see at present, the Jamálgaṛhí remains do not vary much in style, and their execution cannot be extended over a very long period. The best may be dated A. D. 250, and the latest A. D. 300. Of course, all such dates must be regarded as mere approximations in round numbers.

I have adduced (*ante*, p. 168) reasons for believing that the sculptures from the upper monastery at Nuttu are slightly later, dating from about A. D. 300. Those from the lower monastery at the same site belong to the same period.

The Sanghao sculptures, which are fully illustrated by Major Cole, are in general contemporaneous with those at Nuttu, but some of the Sanghao works look a little later.

Many of the sculptures from Mián Khán, which are illustrated by Major Cole's heliogravures Nos. 23 to 30 inclusive, seem to me superior in execution to, and more Greek in style than, those from other sites. But very little difference can be discerned between the work at

* *Archæol. Rep.*, Vol. V, p. 5.

Mián Khán and the best at Jamálgaṛhí. Some of the Mián Khán specimens may be as old as A. D. 200, though none, I should think, are older.

As to Kharkai no detailed information is available. Sir A. Cunningham merely notes that he saw a large collection of sculptures from this locality in the possession of Mr. Beckett, and that he obtained a considerable number himself "similar in all respects to the sculptures that have been dug up at other places."* Inasmuch as Sir A. Cunningham's criticisms are chiefly concerned with the objects obtained at Jamálgaṛhí, it may be assumed that the Kharkai sculptures are not remote in date from those procured at that locality.

"The remains at Sáwaldher, $2\frac{1}{2}$ miles to the east of Jamálgaṛhí, are mostly covered by the houses of the village, and are, therefore, inaccessible. It is believed, however, that some of the finest specimens in the Lahore Museum were obtained at this place by Dr. Bellew."† If this belief be correct, the Sáwaldher ruins must be as old as those at Mián Khán, and it is possible that some of the buildings may have been older, and contained works tracing their parentage directly to Greek art. It is a great pity that the objects in the Lahore Museum were not properly labelled.

The excavations at Sahri Bahlol proved that the site had been occupied in very ancient times, perhaps as early as B. C. 2,000,‡ and the existence of the *stúpas*, containing the broken statue imbedded in it, proves that Buddhist votaries occupied the place as late as A. D. 500 or 600 (A. D. *ante*, p. 155). The broken statue was particularly well executed, and presumably may be referred to the third century.

The information respecting the sculpture at Takht-i-Bahí is very scanty. Mr. Fergusson, from examination of photographs, judged that the remains at this place are of considerably later date than those at Jamálgaṛhí, and his judgment on a question of relative date is entitled to the greatest respect.

At Takht-i-Bahí, a court was excavated, surrounded on three sides by lofty chapels, each of which seems to have enshrined a colossal plaster statue of Buddha, some twenty feet, or more, in height. Such colossal plaster images do not appear to belong to a very early stage of Buddhist art, and their presence confirms Mr. Fergusson's suggestion that the remains at Takht-i-Bahí should be placed late in the series. Perhaps A. D. 400 to 450 may be assigned as a tentative date.

To sum up, I accept the numismatic evidence, agreeing as it

* *Archæol. Rep.*, Vol. V, p. 54.
† *Ibid.*, *ibid.*
‡ *Ibid.*, p. 38.

does with the architectural, that the Ionic pillars found in two temples at Taxila, east of the Indus, date from about the beginning of the Christian era, and are, with the exception of a very few sculptures of the same period, the earliest known examples of Indo-Hellenic work in the Panjáb. These pillars I regard as results of the operation of Hellenistic, as distinguished from Roman, influence. Hellenistic ideas can also be traced in the early Buddhist sculptures, which were executed prior to the establishment of the empire of the Cæsars, at Bhárhut, Buddha Gayá, and other places in the interior of India.

The sculptures from the Yúsufzai country, the kingdom of Gándhára properly so called, which lies west of the Indus, in the immediate neighbourhood of Pesháwar, are, I believe, the work of a local school, probably founded by a foreign colony, which drew its inspiration directly from Roman, and only remotely from Greek art. This local school may be conveniently designated either as the Gándhára or Pesháwar school. The name Græco-Buddhist proposed by Dr. Leitner cannot be asserted to be incorrect, all Roman being only a modification of Greek art, but the term Romano-Buddhist would be much more appropriate.

I cannot say what circumstances caused the establishment at Pesháwar of this peculiar local school, but I do not agree with Sir A. Cunningham in associating it with Kanishka and his immediate successors of the Kushán dynasty, A. D. 80 to 200. On the contrary, I am of opinion that the earliest works of the Romano-Buddhist school of Pesháwar date from about A. D. 200, and that all the sculptures of any considerable degree of artistic merit were executed between that date and A. D. 350. The style probably lingered in decay as late as A. D. 450, but not later.

It follows that I hold that there is a wide interval, at present unbridged, between the scanty remains of early Indo-Hellenic work in the Panjáb, and the abundant specimens of later Indo-Roman work.

The style of the Romano-Buddhist sculpture and architectural decoration shows some affinity with the style of the great temples at Palymra and Baalbec, belonging to the second and third centuries A. D., but its closest relationship, (and the connection is very close indeed), is with the Roman Christian sculpture of the period A. D. 250-450, as seen in the catacombs.

I am well aware that the opinions above expressed are open to dispute, and that I am liable to be thought over-venturesome for expressing them in such positive language. They are, however, the result of a careful and prolonged study of the subject, and I submit them for discussion in the confidence that a distinct expression of definite opinions will bring out clearly the issues to be decided, and prepare the way for final judgment.

### *Section VI.* The Indian Schools of Painting.

The mention of an Indian school of painting must seem absurd to a reader acquainted only with modern India, where no trace of the existence of pictorial art can be discerned, unless the pretty, though conventional, miniatures which a few craftsmen at Delhi are still able to execute, be counted as an exception.

The paintings exhibited in the show rooms of Rajas' palaces, and the decorations of modern temples and private houses are scarcely more deserving of the name of art than the caricatures scribbled by boys on the wall of their schoolroom. In the India of to-day painting and sculpture are both lost arts. The little feeling for beauty that survives is almost confined to small bodies of skilled artizans, and is with them rather the inherited aptitude of the members of a guild for the work of their trade, than a genuine artistic taste. This statement may seem very shocking to the amiable gentlemen who, of late years, have bestowed unmeasured praise upon the æsthetic merits of Indian carpets, shawls, vases, and so forth, but 'tis true 'tis pity, and pity 'tis 'tis true.

My concern, however, is with the past rather than the present, and I must not tilt against South Kensington windmills. Whatever be the merits of modern productions, ancient India certainly produced paintings which deserve to be ranked as works of art. They do not, I believe, deserve a very high rank, when compared with the world's masterpieces—no Indian art work does—but they are entitled to a respectable place among the second or third class. The utter inability of the modern Hindú to express anything human or divine with either brush or chisel produces in the mind of the European observer in India a feeling of surprise when he finds a sculpture or painting which can be described as the work of an artist, and admits of comparison with the productions of Europe, and inclines him to exaggerate the merit of his treasure trove. The Gándhára or Pesháwar sculptures, which have formed the principal subject of this paper, would be admitted by most persons competent to form an opinion, to be the best specimens of the plastic art ever known to exist in India. Yet even these are only echoes of the second rate Roman art of the third and fourth centuries. In the elaboration of minute, intricate, and often extremely pretty, ornamentation on stone, it is true, the Indian artists are second to none. The stone-cutters in Gándhára and at Amarávatí display the same skill in drawing elaborate patterns, and the same skill in executing them, which we now admire in the work of the modern carpet-weavers and vase-makers. But in the expression of human passions and emotions Indian art has completely failed, except during the time when it was held in Græco-Roman leading strings, and it has scarcely at any time essayed an attempt to give visible form to any divine ideal.

Such being the deficiencies of Indian sculpture, the same may be looked for in Indian painting.

The sculptures of Gándhára, Amarávatí, and the Western Caves frequently show traces of paint, from which it appears that the Indians adopted the common Greek practice of using colour to heighten the effect of sculpture. No Indian coloured sculpture, however, has sufficiently retained the pigment to allow modern critics to judge of the effect produced. In Gándhára the gilder's art was freely employed, in addition to that of the painter, in order to add to the magnificence of sculpture. Such extraneous aids, whether employed by Greeks or Indians, seem to our modern taste derogatory rather than helpful to the dignity of sculpture, and, this being so, we need not regret the loss of the pigment and gilding, which would in our eyes have vulgarized sculptures, which we can honestly admire as they stand in naked stone.

But, besides these questionable expedients, the artists of ancient India knew how to supplement sculpture by the art of painting in forms recognized by all to be legitimate. Mr. Fergusson expresses the confident belief that paintings, such as are commonly called frescoes, contributed to the decoration of the Gándhára monasteries. It is very probable that his belief was well founded, but no scrap of any such painting has yet been found, and at present a Gándhára school of painting has only a hypothetical existence.

In Western India the destroying hand of time has been a little more merciful, and has spared enough of the ancient paintings to show that during the first five centuries of the Christian era India possessed artists who could paint pictures of, at least, respectable merit.

Fragments of paintings on walls and ceilings can be detected in the cave temples of the Bombay Presidency at several sites, but the only localities where intelligible pictures have survived, so far as is known at present, are Ajaṇṭá in the Nizam's dominions and Bágh in the district of Ráṭh in the south of Málwá. The paintings at the latter place are known only from brief descriptions in Messrs. Fergusson and Burgess' works, which are not sufficient to form the basis for critical discussion.*

Our knowledge of ancient Indian painting is practically restricted to the pictures on the walls and ceilings of the celebrated caves at Ajaṇṭá. No attempt has yet been made to discuss methodically these interesting

* *Cave Temples of India*, pp. 363-366; and *Notes on Bauddha Rock Temples of Ajaṇṭá*, pp. 94, 95. Recently a series of remarkable Jain paintings has been discovered at Tirumalai, 30 miles south of Vellore in the Madras Presidency. The paintings belong to two distinct periods, but their dates have not yet been determined. (*Proc. Govt. of Madras, No.* 803, *Public, dated* 11*th June*, 1887.)

paintings, or to determine definitely their place in the history of art.* I think that any qualified critic who undertakes the study of these works will find that they are well worth attentive examination, from the points of view both of the archæologist and the artist, but such qualified critic, competent to grasp alike archæological and artistic problems, has not yet come forward.

I cannot pretend to write a criticism on the Ajaṇṭá paintings. I have not had time to study them minutely, nor have I the technical knowledge requisite to enable me to determine their æsthetic value. But I am fully persuaded that they are to be numbered among the fruits of foreign teaching, either by Greeks, or Roman pupils of Greek masters, and, holding this opinion, I cannot omit all notice of them from an essay which aims at giving a general, though imperfect, view of the manner and degree of Græco-Roman influence on the art and other elements of the civilization of ancient India.

At Ajaṇṭá fragments of painting exist in thirteen caves, but the principal remains are found in seven. "The Ajaṇṭá pictures are not frescoes in the true acceptation of the term. The painting was executed on a coat of thin, smooth plaster, the thickness of an egg-shell, which was laid on a groundwork composed of a mixture of cowdung and pulverized trap, rice-husks being sometimes added to increase the binding properties of the mixture."†

As regards the style of the pictures Mr. Griffiths' general criticism is to the effect that there is "little attention paid to the science of art—a general crowding of figures into a subject, regard being had more to

* The most competent account of the Ajaṇṭá paintings yet published is that given in the second work referred to in the preceding note. The full title of the book is "*No.* 9, *Archæological Survey of Western India. Notes on the Bauddha Rock-Temples of Ajaṇṭá, their Paintings and Sculptures, and on the Paintings of the Bágh Caves, Modern Bauddha Mythology, etc.* By J. Burgess, M. R. A. S., etc., Bombay, 4to.; Printed by order of Government at the Government Central Press, 1879." This work is now out of print, and sells at double its original price. It is illustrated by twenty-nine plates, uncoloured, fifteen of which are devoted to the paintings.

Four pretty good uncoloured plates illustrate Dr. Rájendralála Mitra's paper on the paintings in Vol. XLVII (1878) of the Journal of the Asiatic Society of Bengal.

The architecture and sculpture of the Ajaṇṭá caves are discussed with great fulness in Vol. IV of the Reports of the Archæological Survey of Western India, and are there illustrated by splendid autotype plates, but the paintings are scarcely noticed in that volume.

The volume of *Notes*, the full title of which has been given above, belongs to a series of minor treatises in paper covers, issued by the Bombay Government preliminary to the publication of the costly and elaborate series of Reports.

† *Indian Antiquary*, Vol. II, p. 152.

the *truthful* rendering of a story than to a *beautiful* rendering of it:—not that they discarded beauty, but they did not make it the primary motive of representation."*

The range of date of the Ajaṇṭá paintings is very nearly the same as that of the Gándhára sculptures, though some of the former are earlier, and some may be a hundred years, or even more, later than any of the latter. The earliest paintings at Ajaṇṭá, those on the side walls of Cave No. X, are referred by Mr. Burgess to the latter part of the second century A. D. To a large extent the Gándhára and Ajaṇṭá works are certainly contemporary, and it is *primâ facie* probable that, if the sculptures echo the ideas of the art of imperial Rome, paintings of the same period should not have escaped the influence of the cosmopolitan canons of taste which then determined the forms of art. I am not prepared to prove in detail the Greek or Roman parentage of the Ajaṇṭá paintings, but I have little doubt that critical study will prove them to be more Roman than Greek. Their realism, on which Mr. Griffiths comments, is one of the most characteristic features of the Gándhára sculptures, and is thoroughly Roman. Some of the panels, too, filled with elegant floral decorations are extremely like Roman work in appearance.

The Gándhára sculptures are so closely related to the Christian sculptures in the Catacombs of Rome, that I venture to suggest that it would be worth while to compare the paintings in the Catacombs with those in the Ajaṇṭá caves. A hasty comparison of copies of both led me to suppose that they might be related, but I am not in a position to offer a definite opinion on the subject.

The neglect of years has, it is understood, in great part destroyed the original paintings at Ajaṇṭá, and, unfortunately, the fine copies in oils, on which Major Gill spent many years, were mostly consumed by the fire at the Crystal Palace in 1860. A few of his copies then escaped, but, I believe, perished in a later fire at South Kensington. Mr. Griffiths, of the Bombay School of Art, has since made a fresh set of copies of a portion of the paintings, and these copies are now exhibited in the Indian Museum at South Kensington. The ordinary visitor, however, can be little impressed by them, in the absence of descriptive labels or catalogue to indicate the history, meaning, or artistic value of the paintings. I should add that, notwithstanding his remarks on the subordinate place given to beauty as compared with realism in the Ajaṇṭá paintings generally, Mr. Griffiths bestows very high praise on particular compositions, and his judgment is supported by the great authority of Mr.

* *Indian Antiquary*, Vol. III, pp. 25-28. So far as I am aware, Mr. Griffiths' report has not been published in full. Considerable extracts from it are given in the *Indian Antiquary*, and in Mr. Burgess' *Notes*.

Fergusson. One of the most remarkable paintings is in the hall of Cave No. XVI, and is supposed to date from the sixth century. The subject is the death of a lady, apparently a princess. The treatment of it has elicited from Mr. Fergusson the comment that "Mr. Griffiths very justly remarks on this picture that 'for pathos and sentiment and the unmistakeable way of telling its story this picture, I consider, cannot be surpassed in the history of art. The Florentines could have put better drawing, and the Venetians better colour, but neither could have thrown greater expression into it.' "*

Mr. Fergusson also quotes with approval the criticism of Mr. Griffiths on a painting depicting flying figures in the so-called Zodiac Cave, No. XVII:—

"Whether we look at its purity of outline, or the elegance of the grouping, it is one of the most pleasing of the smaller paintings at Ajaṇṭá, and more nearly approaches the form of art found in Italy in the thirteenth and fourteenth centuries than any other example there. The easy upward motion of the whole group is rendered in a manner that could not easily be surpassed."†

Whether these panegyrics are overstrained or not I shall not attempt to decide, but I am fully persuaded that no art at all deserving of such praise was ever born on Indian soil.

"India, meditated, brooded, elaborated, but the originating imagination is not found in the dream-life."‡

Whoever seriously undertakes the critical study of the paintings at Ajaṇṭa and Bágh will find, I have no doubt, that the artists drew their inspiration from the West, and, I think, he will also find that their style is a local development of the cosmopolitan art of the contemporary Roman Empire.

### *Section VII.* The Art of Coinage in India.

The opinion expressed by Lenormant that the mechanical process of coining money, properly so called, was unknown to the Indians until they learned it from the Greeks after the invasion of Alexander, was vigorously combated by the late Mr. Thomas on several occasions, and, in my judgment, with success.§

* *Cave Temples of India*, p. 307.

† *Cave Temples of India*, p. 311.

‡ This quotation is taken from a letter of my friend Dr. R. Atkinson, the learned Professor of Sanskrit in the University of Dublin.

§ The question is discursively treated in Mr. Thomas' papers on the Earliest Indian Coinage and on Ancient Indian Weights in the *Numismatic Chronicle* for 1884, and in his revised edition of the latter paper in the first volume of the *International Numismata Orientalia*.

The truth seems to be that, though all ancient Indian coinages with the slightest pretensions to artistic merit are ultimately of Greek origin, yet the idea of coining money, and a knowledge of the simple mechanical processes necessary for the production of rude coins originated independently in India, or, at the least, were not borrowed from the Greeks.

Although I agree with Mr. Thomas and Sir A. Cunningham in rejecting the theory of the Greek descent of all Indian coins without exception, it must be admitted that it would be extremely difficult, if not impossible, to prove that any particular ancient Indian coin now extant is older than the time of Alexander the Great. Sir A. Cunningham has ventured more than once on the bold assertion respecting the so-called 'punch-marked' coins, that "many of them are as old as 1000 B. C., and perhaps even older."*

When it is remembered that no stone building, sculpture, or inscription anywhere in India is known to exist which is older than the reign of Aśoka, some seventy years after the invasion of Alexander the Great, it is clear that a claim on behalf of a coin to an antiquity of 1000 B. C. is very difficult to substantiate. Nothing in India exists, which can be compared with it, that is not seven and a half centuries later in date. The supposition that any Indian coins are to be dated 1000 B. C. is a mere guess, unsupported by a single fact. I cannot venture to name any other date for the beginnings of Indian coinage, for the reason that nothing really is known on the subject. It is possible that certain coins may be very old, but they cannot be proved to be so, and the independent origin of Indian coinage cannot be demonstrated by showing that any given extant piece is older than Alexander. I do not know of the existence of any Indian coin which may not possibly be later than his time.

The really valid reason for denying the Greek origin of the art of of coinage in India is that several classes of early Indian coins do not exhibit a single clear trace of Greek influence, whereas they are plainly marked by special Indian characteristics.

The coinage of India in its most primitive form consisted of small, oblong, roughly rectangular plates of silver, without any impression on the surface, but struck to a definite standard of weight, namely, 32 *ratís*, or $58\frac{1}{2}$ grains. A slight improvement was made when these little plates of silver were stamped with rough devices of stars, trees, and so forth. These devices were impressed by means of small punches, not covering the face of the coin, and sometimes it appears that all the various patterns on the surface of a single piece, were not executed at once, but were impressed successively at different times by the aid of several

* *Archæol. Rep.*, Vol. I, p. 70; II, pp. 229, 264, 288.

punches. Coins of this kind, which were struck both in silver and copper, are, therefore, known to Indian numismatists as 'punch-marked' coins. Like the blanks, which presumably preceded them, they are struck to the Indian standard of 32 *ratis*. This standard cannot, I believe, be in any way connected with the Greek metric system. The punch-marked coins are destitute of legends, but the purely Indian character of their devices and their Indian standard of weight render it incredible that they should be the result of Greek influence.

Other early Indian coins with a general resemblance to the punch-marked pieces were either cast in a mould or struck with a die covering the face of the coin, and some few of the oldest of such cast and die-struck coins, which follow Indian standards of weight, are inscribed with characters of the form current in the days of Aśoka. The devices of these coins are as indigenous as those of the punch-marked class.*

It is, I venture to suggest, by no means unlikely that the use of legends on coins was suggested by Greek example. The earliest inscribed Indian coins are proved by the characters used in their brief legends to belong approximately to the period of Aśoka, whose inscriptions are the earliest examples of the use of the alphabet, afterwards known as Devanágarí. The history of that alphabet has not yet been satisfactorily traced, and the sudden appearance of long and complicated records inscribed in its characters during the reign of Aśoka is an unexplained mystery. The simultaneous first appearance on Indian soil of stone architecture and stone sculpture in the same reign is another mystery. But, however mysterious be the exact origin of all these sudden innovations, it is tolerably clear that they were in some way the result of the foreign, especially the Greek, influences which certainly affected the policy both of Aśoka and his grandfather. It seems to be a plausible conjecture that the introduction of coin legends about the same time was another effect of the same potent foreign forces.

However this may be, the various kinds of early coins, to which I have alluded above, bear no other mark whatever of foreign origin. It is, therefore, reasonable to conclude that the art of manufacturing

* For discussion of these early Indian coins see the above quoted essays by Mr. Thomas. In Cunningham's *Archæol. Rep.*, Vol. VI, pp. 213-220, Mr. Carlleyle has attempted a classification of the punch-marked coins, the weights of which are discussed by Sir A. Cunningham in *ibid.*, Vol. XIV, p. 16. The classes of early coins found at Eran are discussed and figured in *ibid.*, Vol. X, p. 77, Pl. XXIV. See also *ibid.*, Vol. II, p. 10; V, p. 154, Pl. XXXI, and VI, p. 167. But the numismatic history of India remains to be written. I assume 1·825 grain as the best established value for the *raṭí*, for the reasons stated in *Journal As. Soc. of Bengal* Vol. LIII, part I, p. 146.

such rude coins was invented in India independently of Greek teaching. But this conclusion does not prove that any such coins should be assigned to a very remote period. It is quite impossible to say when the use of blank or punch-marked rectangular pieces of silver or copper of definite weight began, and it is difficult to say when it ended. I suspect that in out-of-the-way corners of India the old-fashioned punch-marked pieces continued to be struck centuries after coins of more regular fabric had become familiar in the more advanced parts of the country, and that specimens of the ancient, indigenous coinage long continued in circulation side by side with pieces struck in imitation of foreign models. At the present day the people of the districts between Fyzabad and Patna obstinately cling to the custom of using the clumsy, mis-shapen lumps of copper, known as 'dumpy' or 'Gorakhpurí pice,' and refuse to circulate the well-executed, and, to European notions, convenient copper coinage issued from the British mints. During the past year the Government of India has found itself compelled to make an effort to suppress by law the currency of the unauthorized 'dumpy pice.' The mere form, then, of any given punch-marked or other rude uninscribed coin is a very imperfect test of its age.

So far as I can learn, no definite evidence is producible to show that any Indian coin now extant is of earlier date than B. C. 300. The complete absence of all traces of foreign influence on the Indian coins of the most primitive form renders probable the hypothesis that some of them were struck before India entered into at all intimate relations with the peoples of the West, but that is the most that can at present be said in favour of the alleged extreme antiquity of some Indian coins. The arguments of Mr. Thomas, so far as they are based on the references to coins in the Code of Manu and other early Sanskrit books, cannot be regarded as valid, when viewed in the light of modern research into the chronology of Sanskrit literature.

The rare, but now well-known coins of Sophytes, a prince in the Panjáb, who was contemporary with Alexander the Great, are rather earlier than any indigenous Indian coins can be proved to be, and are altogether Greek in device and legend, though perhaps not in weight-standard. They are modelled on the pattern of coins of the Seleucid kings of Syria.*

The extensive mintages of the Græco-Bactrian kings (from B. C. 246 to *circa* B. C. 25) were mostly issued in countries beyond the limits of India, but long circulated freely in the Panjáb, the valley of the Ganges, and the ports of the western coast.

* Gardner, *Catalogue of Coins of Greek and Scythic kings of Bactria and India*, p. xx.

No known coin can be determined to have been issued by the great Aśoka or any member of his dynasty. The few legends found on coins of the period give no clue to the name of the reigning sovereign. Aśoka must have struck coin to a large extent during his long reign, and, as not a single piece bearing his name has been found, the only possible conclusion is, that the bulk of his coinage consisted of the rude, uninscribed pieces above referred to. These coins were struck, as we have seen, to the Indian standard, and they circulated side by side with the Græco-Bactrian issues, specimens of which are found in large numbers all over Northern India.

The general adaptation in India of Greek or Græco-Roman types of coinage was the result of the Indo-Scythian invasions about the beginning of the Christian era. The indigenous Indian coinage consisted of silver and copper. I cannot undertake to say that gold coins were absolutely unknown in India before the Indo-Scythian invasions, but, if they existed, they were insignificant in quantity, for not a single specimen of them has ever been discovered. The earliest gold coins struck in India, which follow the indigenous scale of weights, are the heavy coins of Chandra Gupta II of the Gupta dynasty, and these are not earlier than A. D. 400. All coins of the Gupta dynasty are die-struck, and their outward form, whether they follow the Indian or the Greek weight-standard, is ultimately derived from Greek originals.*

The Indo-Scythian kings introduced a regular gold currency into India and struck vast quantities of gold coins, as well as of copper. Their gold coins combine various foreign elements, but are essentially Roman *aurei*, equivalent to Greek *staters*. The Gupta coinage is related to the Indo-Scythian, and its devices exhibit faint traces of Greek artistic power as late as A. D. 400. After the break-up of the Gupta empire about A. D. 480, the coinage of India became utterly barbarous, and lost all marks of Hellenic influence on design, legend, or standard.

As regards the origin of coinage in India my opinion, in short, is that the art of coinage in rude forms arose in India quite independently of Greek teaching. Neither the invasion of Alexander the Great, nor the example of his Bactrian successors sufficed to induce the princes of India to abandon their indigenous style of coinage. One petty chief in the Panjáb, Sophytes by name, struck coins after the Greek fashion, but found no imitators in the interior of India. Aśoka and the other sovereigns of the Maurya dynasty continued to issue coins of the old native pattern, on which they did not even inscribe their names.

* For information in detail about the Gupta coinage I must refer to my paper on the Early or Imperial Gupta Dynasty of Northern India in the Journal of the Royal Asiatic Society for 1889, pp. 1-158, with five plates.

The general (though not universal) adaptation of Greek numismatic forms copied from Roman coins was the work of the Indo-Scythian dynasties, whose rule in the Panjáb began a little before the Christian era, and spread over all Northern India during the three following centuries. The introduction of coins of Greek type was synchronous with the development of an extensive gold currency, which partly replaced, and partly supplemented the existing issues in other metals.

The Gupta coinage A. D. 350 to 480 is a development of the Indo-Scythian.

From the fall of the Gupta empire to the establishment of the Muhammadan power all Indian coinages are barbarous and chaotic, and completely destitute of artistic merit.*

The die-cutters of India never attained any high degree of excellence in their art. Those of Bactria, as distinguished from India, produced coins, not, indeed, approaching in beauty those of Syracuse, but possessing characteristics which entitle them to respectful consideration as works of art.

Professor Gardner observes;—"In the types used by Greek kings we find great variety, and they open to us quite a new chapter of Greek art, affording fresh proof of the remarkable originality of the artists of the Hellenistic age.

"In regard to the style we may note two points: (1). The extraordinary realism of their portraiture. The portraits of Demetrius (pl. II, 9), of Antimachus, (V, 1), and of Eucratides, (V, 7), are among the most remarkable which have come down to us from antiquity, and the effect of them is heightened in each case by the introduction of a peculiar and strongly characteristic head-dress, which is rendered with scrupulous exactness of detail.

"(2). The decidedly Praxitelean character of the full length on the reverses. The figures of Herakles (pl. II, 9; III, 3), of Zeus (IV, 4; VII, 2), of Poseidon, (V, 1), of Apollo (V, 4; IX, 10), are all in their attitudes characteristic of the school of Praxiteles."†

Some of the Bactrian coins were struck within the limits of the territories now known as India, but most of them were minted beyond the border, and the Bactrian coinage, as a whole, is foreign to India.

* My remarks must be understood as applying only to Northern India in the widest sense. The system of coinage in Southern India has always been quite distinct, and I do not profess to have studied its history. The Peninsula was never brought into really close political relations with Northern India until the establishment of the British supremacy. Even Aurangzíb's protracted campaigns did little to bridge over the gulf between the two regions.

† *Catalogue of Coins of Greek and Scythic kings of Bactria and India*, p. lviii.

I do not propose to discuss its relations with the general course of Greek art, and refer to its peculiarities only to enquire how far they affected the art of coinage in India.

The realistic portraits executed by the Bactrian artists were beyond the powers of the Indian die-cutters. The Indo-Scythian coins, except the very latest, are well executed pieces of metal work, but, without exception, almost totally wanting in artistic merit. The effigies of the kings are conventional, and the whole design is stiff and formal. Some of the Gupta coins display more freedom and originality in design, but not a single example of a recognizable portrait can be found, I believe, either in the Indo-Scythian or Gupta series.

The influence of the second peculiarity of the Bactrian coinage noted by Professor Gardner can be discerned in the Gupta series, though not, I think, in the Indo-Scythian. The peculiar attitude of the standing statues of the school of Praxiteles consists in this that the weight of the body is thrown on one leg, the figure being inclined to one side, and bent in a graceful curve so that the hip on the other side is arched outwards. This peculiarity, which in the hands of a good Greek artist, added grace to the representation of the human form, was imitated by the Græco-Bactrian mint masters with considerable success. It caught the Indian taste, but, in the hands of clumsy imitators, was converted into a hideous deformity. An inartistic exaggeration of the Praxitelean attitude is characteristic of many of the Gupta coins of the fifth century, and of much Indian sculpture from an early date until the present day.

Unhappily the history of Indian art, is, as observed by Mr. Fergusson, a history of decay, and the criticism, passed by Sir A. Cunningham on Indian sculpture, applies, *mutatis mutandis*, to other arts :—

"It is a fact, which receives fresh proofs every day, that the art of sculpture, or certainly of good sculpture, appeared suddenly in India at the very time that the Greeks were masters of the Kábul valley, that it retained its superiority during the Greek and half-Greek rule of the Indo-Scythians, and that it deteriorated more and more the further it receded from the Greek age, until the degradation culminated in the wooden inanities and bestial obscenities of the Brahmanical temples."*

The employment of fairly well-executed Greek legends on the coins of the Indo-Scythian kings of the first two centuries of our era proves that the epithet 'half-Greek' applied to their rule by Sir A. Cunningham is not unsuitable. Kanishka and his successors would not have impressed Greek legends on their coins, unless the Greek language had considerable currency among their subjects. I do not, of course, mean

* *Archæol. Rep.*, Vol. III, p. 100.

to suggest that Greek was ever commonly spoken or read in India, but it must certainly have been understood by many of the court officials. The language in the time of Kanishka and Huvishka probably occupied a position similar to that of the English language in India forty or fifty years ago, previous to the development of the existing system of public instruction.

The knowledge of Greek seems to have lingered longest in Gujarát. Corrupt Greek letters are found on the silver coins of Skanda Gupta struck in that region as late as A. D. 450, and they also occur on similar coins of his father and grandfather. The letters on these coins are unmistakeably Greek in form, but meaningless, and are evidently imitations of legends, which were once significant, executed by men unable to read Greek. It is plain, therefore, that even on the western coast, where the agency of maritime commerce had for centuries maintained an active intercourse with the Hellenistic world, all knowledge of the Greek language had died out by A. D. 400. In Northern India such knowledge seems to have been lost two centuries earlier.

It is curious that not a single Greek inscription, other than coin-legends, has yet been discovered either in India or in Afghánistán.

The numismatic facts, to which I have briefly referred, help to render credible and intelligible the alleged Greek influence on Indian literature, science, and philosophy, to the consideration of which I shall now devote a few pages.

### *Section VIII.* The Origin of the Indian Drama.

The existence of a considerable ancient dramatic literature in the Sanskrit language was made known to European readers at the close of the last century by Sir William Jones' translation of Śakuntalá, a charming pastoral play, which is, perhaps, the only Sanskrit work that has taken a place among the literary classics of the world.

Since Sir William Jones' time the Sanskrit plays have attracted many students and translators, notably Horace Hayman Wilson, whose well-known work, *Specimens of the Theatre of the Hindus*, is still the leading authority on the subject.

The question of the origin and affinities of the ancient Indian drama has excited the curiosity of scholars, from the time of its discovery until the present day, and various attempts have been made to solve the problem.

The circumstance that the Sanskrit name for a dramatic composition is derived from a root which conveys the idea of dancing naturally suggested the theory, which readily found favour, that "the Indian drama arose, after the manner of our modern drama in the Middle Ages,

out of religious solemnities and spectacles (so-called 'mysteries'), and also that dancing originally subserved religious purposes."*

But this plausible theory has, unfortunately, very little historical basis, and a rival theory that the dramatic literature of India is a direct descendant of the epic seems not to rest on any more solid foundation.†

It is not improbable that rude pantomimic representations of the incidents of sacred stories, resembling the modern Rámlílá, may have been as popular in ancient times as they are now, but even if they were, they could hardly be regarded as the parent of the Indian drama. Such exhibitions in their modern form, of which alone anything is known, remain unchanged from year to year, and appear quite incapable of literary development. Their ancient predecessors, if any existed, cannot be credited with any greater power of generating literature. The Sanskrit drama includes pastorals, elaborate comedies of real life, complex pictures of political intrigue, and other varieties of highly artificial composition. The gap between such compositions and a clumsy 'mystery' like the Rámlílá is vast and unbridged, and the interval between them and displays of sacred dancing or formal recitations of epic episodes is equally wide.

The Indian drama, as Professor Weber remarks, "meets us in an already finished form, and with its best productions." Whence came this finished form; was the ripe fruit not preceded by seed or flower?

It is impossible to believe that the "finished form" sprang, Minerva like, from the head of Kálídása. The dramatic literature of India, like all other ripe productions of art in all countries and ages, must be either the result of an independent, and therefore slow, process of evolution worked out on native soil, or be the more sudden effect of the fertilization of an indigenous germ by a potent foreign influence.

The latter solution of the problem, is, I have no doubt, the true one. It is not easy to disentangle the life history of the indigenous germ, concerning the true affinities of which opinions may well differ,‡

* Weber, *History of Indian Literature.* (Trübner), p. 197. This theory is well expressed in the brilliant article on Sanskrit Poetry and the Hindu Drama by Dean Milman, which appeared in the *Quarterly Review* for 1831. Dean Milman considered that the Indian plays more closely resembled the Spanish than those of any other European country.

† Brockhaus, who denies all Greek influence on the Indian drama, maintains the epic theory. I have not seen his writings.

‡ Windisch himself (p. 6) admits that the Epics contain a dramatic element, and that the Indian drama was indebted to some extent, as the Greek also was, to the epos for help. He is of opinion (p. 8) that dramatic representations, based on epic stories, existed in India before foreign influences were felt, such representations being simply due to the natural desire to see, as well as hear, the stories. This

but the vivifying foreign influence can be isolated, and subjected to microscopic investigation.

That foreign influence which gave India her noble dramatic literature is the same which bestowed upon her the arts of the painter, sculptor, and engraver—the undying spirit of Hellas. India received this, her spiritual guest, but for a little while and grudgingly. When he took wing and fled to more congenial dwelling places the arts soon followed in his train.

Professor Weber was the first to suggest that the representation of Greek dramas at the courts of the Hellenistic kings in Bactria, the Panjáb, and Gujarát awakened the Hindú faculty of imitation, and thus led to the birth of the Indian drama; but the suggestion was qualified, and almost negatived, by the remarks appended to it that the hypothesis does not admit of direct verification, and that no internal connection between the Greek and Indian dramatic literature can be proved.

The Danish scholar, E. Brandes, accepted the hypothesis thus doubtingly propounded, and, rejecting the limitations imposed by its author, boldly undertook to prove the reality of an internal connection between the ancient Indian plays and the New Attic Comedy, as chiefly preserved in the Roman adaptations by Plautus and Terence. I have not seen Dr. Brandes' treatise, nor could I read it if I had, but, fortunately for that large class of persons who are ignorant of Danish, substantially the same thesis has been ably argued by Dr. Windisch in a language more generally intelligible.*

It would be impossible to do full justice to Dr. Windisch's argument otherwise than by a complete translation of his essay. I shall merely attempt to indicate in general terms the nature of some of the leading proofs on which he relies in support of the proposition that the Sanskrit drama is of Græco-Roman parentage.

The general probabilities in favour of the theory that the Indian plays are derivatives of the New Attic Comedy of the school of Menander rest chiefly on the evidence which proves an active and long-continued intercourse between the east and west. Some of this evidence has already been considered (*ante*, p. 157). A special agency for the diffusion of knowledge of the forms of Greek drama among Oriental popu-

opinion seems to be pure conjecture, and is not shared by my learned friend Professor Atkinson. Windisch also holds (p. 10) that epic recitation, and not a lyrical performance associated with music and dancing, was the germ of the Indian drama.

* *Der Griechische Einfluss im Indischen Drama.* Von Ernst Windisch. Aus den Abhandlungen des Berliner Orientalisten-Congresses. 8vo, pp. 106. Berlin, A. Asher and Co., Weidmannsche Buchhandlung, 1882.

lations was furnished by the travelling companies of players, who are known to have traversed the Hellenistic kingdoms; and the poets, as well as the players, were not averse to travelling. Menander and Philemon were both invited to the court of Ptolemy Soter.

Greek ideas entered India chiefly by two routes, one overland through Palmyra and Bactria, the other maritime through Alexandria and the ports of the western coast, especially Barygaza, the modern Bharoch. We know from the anonymous Periplus of the Erythræan Sea, which was written between A. D. 80 and 89,* that a very active commerce was then carried on between Barygaza and the inland city Ozéné (the modern Ujjain in Sindia's territory), where Aśoka had once been Viceroy, and which, in the time of the author of the Periplus, was the great depôt of the foreign trade.

The scene of the 'Toy-Cart,' the most ancient Indian drama extant, is laid at Ujjain, and several considerations lead Dr. Windisch to conclude that the Indian drama was first developed at that city, as a direct consequence of intercourse with Alexandria. The few known facts in the history of the Bactrian king Menander, who flourished about B. C. 110,† indicate that the overland communication between India and the West must have been briskly maintained in his time. The importance of Palmyra as a commercial depôt (*ante*, p. 157) was of later date. Before the Christian era the Western communications of India were with the Hellenized kingdoms of Asia and Egypt. In the first century after the Christian era they were extended to Rome and the Roman provinces. It is, in my opinion, not at all unlikely that the New Attic Comedy was known to learned men in India through the Latin adaptations of Plautus and Terence as well as in the original Greek.

Whether it be admitted or not that the Indian drama is of foreign origin, no one, I suppose, will venture to deny that ample opportunities existed during several centuries for the importation of all sorts of Greek ideas, dramatic or other.

In the opinion of Dr. Windisch the cumulative effect of the evidence of resemblance in particular points between the Indian and Græco-Roman dramas is so great that "we must recognize either a wonderful case of pre-established harmony, or the existence of Greek influence on the Indian drama." The dilemma appears to me to be expressed with perfect accuracy, and I am fully convinced of the reality of the Greek

* The proof is given in the Introduction to McCrindle's translation.

† This is the date adopted by Professor Gardner in his Catalogue of Coins of the Greek and Scythic kings of Bactria and India.

influence on the Sanskrit drama, and further, that without that influence the dramatic literature of India would never have come into existence.

The formal structure of the Sanskrit dramas closely resembles that with which we are familiar in Plautus and Terence. Like the Græco-Roman, the Indian plays are divided into acts and scenes, and each piece is preceded by a prologue. The mere fact of the existence of the prologue in the Indian, as in the European plays, is in itself surprising, and can hardly be regarded as a merely casual coincidence. The improbability that it is such becomes much greater when we observe that in both cases the prologue is devoted to the same purposes, the announcement of the names of the poet and the play, the gaining favour of the spectators, and the preparation of their minds for the piece itself.

Again, it cannot well be the result of accident that the love-story of the Indian drama is in plot, development, and *dénouement* essentially of the same kind as that of Græco-Roman comedy. The plot of the 'Toy-cart,' the most ancient Indian play extant, may be accurately described in the words applied by Rost to the Curculio of Plautus:—"The subject of this comedy is very simple, and depends, as usual, on a secret intrigue, the lover's want of money, and the supplanting of a rival."

The fair Perditas of Plautus and Terence, who eventually prove to be high-born daughters of Athenian citizens, find their parallel in the maid-servants of the Indian plays (*Málavikágnimitra* and *Ratnávalí*), who turn out to be princesses in disguise; and the ἀναγνωρισμός, or recognition of the disguised young lady, which is a critical incident in nearly every Græco-Roman play, is repeated, merely with variations of detail, in the Indian adaptations.

Other stock characters of the Terentian comedy have also been imported into the Sanskrit drama.

The *parasitus edax*, the *miles gloriosus*, and the *servus currens*, so familar to all readers of the Græco-Roman comedies, are reproduced respectively as the *viṭa*, *śakára*, and *vidúshaka* of the earliest Indian drama. The external origin of these strongly marked characters, is clearly indicated by the facts that the three personages are found together only in the 'Toy-cart,' the oldest drama, which was composed while India was still in communication with the Hellenistic world, and that all three were discarded by Bhavabhúti, who lived about A. D. 700, when Greek influence had ceased to directly affect India. Dr. Windisch's detailed analysis of these characters is very interesting, but is too long for reproduction.

One striking argument, however, must not be omitted. The Sans-

krit author Bharata, who wrote a technical treatise (*nátyaśástra*) on dramatic art, lays down the rule that the players should be five in number, namely, the *sútradhára*, his assistant, the *páripárśwaka*, the *viṭa*, *śakára*, and *vidúshaka*. This enumeration, Dr. Windisch points out, is equivalent to a list of the regular male personnel of a Græco-Roman play, but does not apply to any extant Indian play, except in so far that all the five personages named appear in the 'Toy-cart,' in which alone the *śakára* is found. The *viṭa* is met with in only one other piece (*Nágánanda*). It is therefore difficult to understand why Bharata should have laid down this rule, unless pieces were extant in his time which conformed to it, and these pieces must have resembled the Greek models at least as closely as the 'Toy-cart' does.

Tho repulsive character of the *lena*, or μαστροπός, the go-between and corrupter of maiden virtue, is faithfully reproduced in the character of the mother of Vasantasená in the 'Toy-cart,' and the elevation of Vasantasená herself to a respectable position by the force of unselfish love may be compared with the story of Silenium in the Cistellaria of Plautus. The very name of the 'Toy-cart' (*mṛichchhakatiká*) recalls the names of Plautine plays such as Aulularia and Cistellaria.

The essay by Dr. Windisch, from which I have quoted, does not exhaust all the arguments which might be adduced in support of his thesis, and the partial analysis of his reasoning given above is far from presenting the case, as stated by him, in its full force. Yet, even what has been advanced in the foregoing pages should, I venture to think, suffice to shake the faith of those who believe in the indigenous origin of the Sanskrit drama, and to prove that strong reasons exist for holding the opinion that India is indebted for the existence of the most generally attractive department in the vast circle of her literature to contact with the artistic Hellenic mind.

It is, perhaps, necessary to observe that no one contends that any extant Indian play is a translation or free adaptation of a given Greek piece. That certainly is not the case. The best Indian plays are the work of native genius of high order, employing native materials in its own way, and for its own ends, but first set in motion by a powerful impulse received from abroad. The case of the drama is analogous to that of the Amarávatí sculptures. I agree with Mr. Fergusson in thinking that those sculptures would never have come into existence, if the latent powers of Indian artists had not been aroused and stimulated by the example and teaching of Greek, or at least of Hellenistic, sculptors, but no one would maintain that the carvings now on the staircase of the British Museum should be classed among the remains of Greek art. They are thoroughly Indian in subject and style, and skilled criticism

is needed to discern the hidden foreign element. So it is with the drama. The plays are Indian, but the idea of composing such plays is Greek.

The case of the sculptures of the Gándhára or Pesháwar school, which I have discussed at such length, is on the contrary, analogous rather to an Indian free translation or adaptation of a Greek play. Those sculptures are close imitations of the contemporary, especially the Christian, art of the Roman empire in the third and fourth centuries, and this fact lies on the surface, visible to any commonly attentive observer. The Roman or Christian subjects have been made to serve Buddhist purposes, but have been transferred bodily to India with little change, save that of name.

*Section IX.* Græco-Roman influence on the Religion, Mythology, Science, and Philosophy of India. Conclusion.

A smile will, I fear, pass over the gentle reader's countenance when he compares the promise of the title with the performance of the few pages of this section of my essay. A discussion, in any degree adequate, of the topics mentioned in the heading would require the ample room of an octavo to itself, the writer of which should be equipped with a store of varied knowledge to the possession of which I can make no pretension. So far as I am aware, no one has yet attempted such a survey of the religion, mythology, science, and philosophy of India as would give a general view of the boundaries which divide the indigenous components from the foreign. A slight, rough sketch of a survey of the kind will be found in Weber's History of Indian Literature, but a map drawn in more distinct colours is much wanted. I cannot attempt to draw it. The preceding pages will, perhaps, have succeeded in convincing at least some readers that the best elements in the plastic, pictorial, numismatic, and dramatic arts of ancient India are of foreign, chiefly Græco-Roman, origin. In these concluding pages I merely wish to point out that the foreign influence was not confined to those fields, where I have traced its workings in some detail, but extended also to other regions of thought. I am not prepared to follow in detail its operations within those regions, nor to catalogue the instances where its presence may be discerned, and can only offer some unsystematic observations.

The Indo-Scythian coin series affords obvious and conclusive evidence that about the beginning of the Christian era the religions of India and those of the neighbouring countries to the west were acting and re-acting upon each other.

The worship of Siva was certainly then established among

other cults, in India, and the figure of the god, armed with his trident, and standing beside his sacred bull, is, perhaps, the commonest mythological device of the Indo-Scythian coins. But he is not exactly the Śiva of the mediæval Puráṇas, a Hinduized aboriginal demon. Sometimes he is hardly to be distinguished from the Greek Poseidon, and the Greek writers on India themselves perceived that he was akin to Dionysus. Dr. Windisch shows that all the Sanskrit plays are associated with the worship either of Śiva or his consort Gaurí, and that they were generally performed, like the Greek dramas, at the spring festival. It seems probable that the Hellenistic settlers in India transferred to Śiva some of the honour due to Dionysus, and the idea of the Indian deity must have been influenced by the Greek conception of those gods in the Olympic pantheon who most nearly resembled him.

Some rare coins of the great Indo-Scythian emperor, Kanishka, bear the name of Buddha, BOVΔO in Greek characters, and afford us the earliest known examples of the conventional effigy of the teacher.

Other Indo-Scythian coins, again, present figures of the personified Sun and Moon, as Greek deities, with their Greek names Helios and Seléne, while many others represent a pantheon of Iranian deities, bearing such strange names as Oksho (Okro), Ardethro, and so forth, the meaning of which is only now beginning to be understood. I cannot here pursue this topic further, and only allude to it for the purpose of indicating that both a little before, and a little after, the Christian era Hellenic and Asiatic forms of religion were interacting, and that both Buddhism and Hinduism must have been modified by the contact with other modes of religious belief.

Even so late as A. D. 400 the devices of the Gupta coins show that the conceptions of Hindú divinities were partly based on Græco-Roman ideas. Lakshmí, the goddess of plenty and good fortune, is invested with attributes plainly borrowed from the τύχη, Abundantia, and other personifications of abstract ideas current in the west. The conception of Lakshmí, the consort of Vishnu, glides imperceptibly into that of Párvatí, Durgá, or Gaurí, the consort of Śiva, and is related to some of the forms both of Venus and Cybelé.*

The apparent resemblances between the Puránic legend of Krishna and the Gospel accounts of Christ are well known, and have formed the subject of much discussion. I am inclined to believe that the Krishna myth is really indebted to the Gospels for some of its incidents·

* For the Indo-Scythian coins see Gardner's Catalogue, and articles by Stein, Cunningham, West, and Rapson in the Babylonian and Oriental Record for 1888 and 1889, and Indian Antiquary for April 1888. For the Gupta coinage see Journal R. As. Soc. for 1889, p. 25, etc.

In the early centuries of the Christian era the religion of Christ in one or other of its forms extended over many parts of Asia where it is now extinct, and it *must* have modified the ideas and beliefs of the peoples among whom it flourished. The Gnostic variety or corruption of Christianity was especially popular in the East, and strong reasons exist for believing in Gnostic influence on the Vedantist philosophy of India. The Bhagavad-Gítá certainly seems to have much in common with the Gospels.*

The extraordinarily close resemblance between many of the sculptures of the Gándhára or Pesháwar school, and the monuments of early Christian art at Rome, which was first observed by Mr. Fergusson, has been discussed at some length in an earlier section of this paper (*ante*, p. 164). The resemblance is certainly real, and, however it may be explained, proves with equal certainty that the Christian and the Buddhist artists had many ideas in common. The Buddhism of Gándhára beyond doubt borrowed Christian forms of artistic expression; it would be strange if the Buddhist teachers did not assimilate, along with the forms, some Christian doctrine. But any attempt to follow this speculation further would carry me beyond my depth.

The Gándhára adaptation of Leochares' group representing the Rape of Ganymede (*ante*, p. 133) shows clearly how easy it was for the ancient Indians to adopt a Greek myth, and convert it to the use of their own religions.

Weber maintains that a substratum of Homeric legend underlies the Rámáyana, and gives good reasons for his opinion. The mere fact that such a suggestion can be supported by plausible arguments indicates that the student of comparative mythology must be careful not to assume the Indian origin of every myth which may have on the surface a purely Indian appearance.

I have shown above (*ante*, p. 133) that the Asuras of Puránic mythology are probably Hinduized adaptations of the Greek giants, who warred with the gods.

The remarkable fact that no images of Buddha are found among sculptures at Bhárhut (B. C. 150), and Sánchi (A. D. 80), while they are numerous at Amarávatí (A. D. 180),† suggested to Mr. Fergusson

* See the translation of Dr. Lorimer's 'Appendix to the Bhagavad-Gítá' in Indian Antiquary, Vol. II, p. 283. That author quotes St. Chrysostom, who died A. D. 407, to prove that a translation of the New Testament into some Indian language existed in his time.

† This is the approximate date of the outer rail. The inner rail is later, and some sculptures date from before the Christian era. The remains at Amarávati illustrate the period from about B. C. 100 to A. D. 250 (Burgess, *Buddhist stúpas of Amarávatí and Jaggayapeṭá*, p. 112).

the bold speculation that the multiform idolatry of modern India is due to contact with the image-worshipping Greeks. Mr. Fergusson thus expresses this daring hypothesis in his latest work :—

"I suspect that when the matter comes to be carefully investigated, it will be found that the Indians borrowed from the Greeks some things far more important than stone architecture or chronological eras. It is nearly certain that the Indians were not idolators before they first came in contact with the Western nations. The Vedas make no mention of images, nor, so far as I can learn, [do] any of the ancient scriptures of the Hindus.

"Buddhism is absolutely free from any taint of idolatry till after the Christian era. So far as we can at present see, it was in the Buddhist monasteries of the Gándhára country, where the influence of Græco-Bactrian art is so manifestly displayed, that the disease broke out, which was afterwards so completely to transform and pervade the outward forms, at least, of all the ancient religions throughout India."*

The propositions thus stated with Mr. Fergusson's customary directness cannot be implicitly accepted, although they embody a considerable amount of truth. It is not safe to affirm that Buddhism before the Christian era was absolutely free from idolatry, for the Taxilan Buddhist temples, adorned with plaster images, were probably erected at the close of the first century B. C. and we do not know, though we may reasonably suspect, that the images are of later date. Statues found at Mathurá, and certain coins of Kanishka (*circa* A. D. 78 to 110) prove conclusively that images of the teaching Buddha in his conventional attitudes, both seated and standing, were well known at the close of the first century A. D.† It is rash to affirm that they were unknown a hundred years earlier. A colossal statue of the standing Buddha discovered by Sir A. Cunningham at Srávastí (Sáhet-Máhet) in Oudh seems to be slightly older than the Mathurá images.‡

It is, however, quite true that in Bihár, Central and Western India, no image of Buddha earlier than the Christian era, or perhaps than A. D. 150, is known, and Mr. Fergusson appears to have been right in holding that the worship of images of the founder of Buddhism was introduced from the North West; and it is probable that the development of sculpture, which was undoubtedly stimulated by Hellenic influence, gave encouragement to idolatrous practices.

Among all the departments of Sanskrit literature the elaborate

* *Archæology in India* (London, Trübner and Co., 1884).

† Cunningham, *Archæol. Reports*, Vol. V, p. vii; and Gardner's *Catalogue*, pp. 130, 175.

‡ Cunningham, *Archæol. Rep.*, *ut supra*, and Vol. I, p. 339.

system of Hindú logic, and the marvellous, almost miraculous, structure of grammar erected by Páṇini and his successors have the greatest appearance of absolute originality. Yet some competent scholars are disposed to seek a western origin even for these. The true position of the Sanskrit logicians and grammarians in relation to the teachers of other countries cannot be satisfactorily determined until the main outlines of the chronology of Sanskrit literature are settled definitely within narrow limits of possible error. The radius of error is gradually being reduced, but a long time must elapse before it is brought within an approximation of zero.

In one branch of Indian science the operation of direct and potent Greek influence, however it may once have been doubted, has been fully demonstrated, and is now admitted by all writers competent to form an opinion on the subject. Indian astronomy, in its exacter form, as taught in the Sanskrit text-books is essentially the astronomy of the Alexandrian schools, and its technical nomenclature is to a large extent Greek in a slight disguise. An earlier, inexact astronomy, probably of Babylonian origin, had been known in India long before the works of Alexandrian professors reached her shores, but all Indian astronomy with any claim to scientific precision is Greek. This scientific astronomy was taught by Áryabhaṭá in A. D. 500, and by Varáha Mihira about half a century later, but it was probably known to some persons in India at a considerable earlier date.*

It is obvious that highly abstruse and technical works like the treatises of the Alexandrian astronomers could not have been mastered by the Indian astronomers except by textual study at a time when the Greek language was still intelligible to learned men in India. The extensive importation of Greek technical terms into the vocabulary of Hindú astronomy shows that the Greek works themselves must have been read in India, and also proves that the ideas expressed by those terms were unfamiliar to the native scholars. If the ideas had been familiar, Sanskrit words to express them would have existed, and, if such words had existed, they would have been used, and the foreign terms would not have been imported. The necessity under which the Hindú astronomers lay of borrowing Greek scientific terms by the score

* Pandit Shankar Balkrishna Dikshit observes that there are two distinct and separate astronomical works, each bearing the name of Áryabhaṭá as its author. The first (to which reference is made in the text), known as *Áryabhaṭíyá*, or *Árya Siddhánta*, bears the date S'aka-saṃvat 421 expired, = A. D. 499-500. It has been published by Dr. Kern. The second work, known as the *Laghu-Árya-Siddhánta*, was composed at some time between A. D. 628 and 1150, and appears never to have been printed. These two distinct works are said to have been sometimes confounded by European writers. (*Indian Antiquary*, Vol. XVII (Nov. 1888), p. 312).

is very strong evidence that their native astronomy was, from the purely scientific point of view, extremely imperfect.

The knowledge of actual Greek books displayed by the Indian astronomers also shows that there is no improbability in supposing that a limited class of readers in India had studied the texts of Greek plays. Dr. Windisch is content to believe that the Greek elements in the Sanskrit drama, the existence of which he demonstrates, were assimilated by the Indian authors through the agency of performances of Greek plays on the stage. It is not necessary, he says, to assume that the texts were known in India. It seems to me impossible that the resemblances between the Greek and Indian dramas should have been brought about in this casual way. It would be nearly as easy to believe that Áryabhaṭa learned the signs of the zodiac and the term 'diameter' from chatting with ship-captains on the quays of Barygaza. I can see no reason whatever to feel sceptical about the reality of the diffusion to a limited extent of Greek books in Greek among the learned classes of India during the early centuries of our era.

The coins and the manuals of astronomy are incontrovertible evidence that some people there could read Greek, and why it should be supposed incredible that Kálídása could read the plays of Menander I cannot imagine.

We are not bound to accept as literal statements of fact the rhetorically expressed assertions of Plutarch and Dio Chrysostom that the Indians sang the poems of Homer, and that the children of the Gedrosians recited the tragedies of Euripides and Sophocles, and may yet feel full assurance that Indian scholars who studied and assimilated Alexandrian manuals of astronomy cannot have been altogether unacquainted with the classic literature of Greece.

I have now reached the bounds to which a general survey of the action of Hellenic influence on ancient India can be conveniently extended at present. The adequate discussion of the Gándhára sculptures alone would fill a goodly volume. The imperfect account of them given above is only intended to stimulate curiosity, and to indicate the directions in which more exhaustive investigation will reward the student.

I do not desire to exaggerate the intrinsic merit of these sculptures, though I feel assured that it is amply sufficient to justify their critical study, and that, even if it were much less than it is, the historical interest attaching to the productions of a school which links together Hellenic and Indian art gives them a right to claim the attention both of Orientalists and of classical scholars.

The discovery of the linguistic and literary treasures of Sanskrit so charmed the imagination of the earlier Orientalists that they lent

a ready ear to the extravagant tales of the pandits, and were willing to attribute the most venerable antiquity and almost absolute originality to the strange civilization and vast literature suddenly brought within their ken.

Modern historical and literary criticism has been steadily engaged in the task of exposing the falsity of Brahmanical tradition or pseudo-tradition, the "lying gabble of Bráhmans," as it has been well called, and of moving up, so to speak, all dates in the early history of India. Páṇini, the grammarian, Manu, the lawgiver, Kálídása, the poet and dramatist, and many other names famed in Indian story, have already been moved up from remote prehistoric, or pre-Christian, times to post-Alexandrian, or post-Christian, dates.*

This process still continues, and simultaneously with the demonstration of the comparatively modern date of all Sanskrit, other than Vedic, literature, the conviction has forced itself upon scholars that the civilization of ancient India was not so indigenous and self-contained as, at first sight, it seemed to be.

India may, apparently, claim with justice to have given birth independently to the mechanical process of coinage, but her weakly numismatic child never attained maturity, and was soon compelled to make way for a stranger of more vigorous growth. The other products of civilization claimed from time to time as independent Indian discoveries are now either proved to be foreign importations, or shown to be, at the best, of doubtful parentage.

I do not know any historical problem more startling at first sight than that propounded by the sudden and simultaneous first appearance in India during the third century B. C. of long documents in two diverse highly developed alphabets, of stone architecture, stone sculpture, chronological eras, inscribed coins, and a missionary state religion.

The problem has not yet been completely solved, and perhaps never can be, but it is certain that the phenomena referred to were largely due to a rapid development of intercourse between India and Western nations in the time of the Mauryan dynasty of Chandra Gupta and Aśoka (B. C. 315 to 222). A further development, or renewal, of that intercourse in the first century before, and the four centuries following, the Christian era, conducted through Bactrian, Alexandrian, and Palmyrene channels, produced new schools of architectural, plastic, and pictorial art, introduced novel types and standards of coinage, taught science in its exacter forms, and gave birth to a dramatic literature of great variety and merit.

* For a convenient summary of much of the recent discussion on the chronology of Indian Literature, see Max Müller's "India, What can it Teach Us?"

The same occidental influences left enduring marks on the religion and mythology of India, modified her epic poetry, and in the opinion of some competent judges, affected even the grammar, logic, and philosophy which are the most characteristic and original products of Indian thought.

The investigation of the relations between the early civilization of India and that of Western nations is still very incomplete, but it has proceeded sufficiently far to warrant the belief that further research will magnify rather than diminish the debt due by India to Assyria, Babylonia, Persia, Greece, and Rome.

## Addendum.

When compiling the Bibliographical List (*ante*, page 113) I omitted to notice the following papers :—

(1.) Indo-Grecian Sculptures from the N.-W. Frontier, by Major J. Abbott (with a Plate). *Proc. As. Soc. of Bengal for* 1854, *page* 394.

This communication briefly notices a large box of sculptures presented to the Society which were "dug from the site of a temple on the left bank of the Indus, called Kala, close below Ghazi Huzara. The winged female is from another old site at present called Shah ke Tere in Quatur. They are very inferior in grace and execution to those from Trans-Indus..... Those at Kala seem to have belonged to a Buddhist temple of small size, but very richly and eleborately sculptured, the material being black clay-slate." The plate represents a head from Ráwalpindi.

(2.) Note on a small Indo-Greek Sculpture, by the same, *ibid*, *for* 1858, *page* 261. The figure described and presented to the Society is one of the Atlantean class, purchased from a native, who had found it in an old fort of the Yúsufzai at the foot of the mountains.

(3.) Account of some of the Sculptures in the Peshâwar Museum, by Rev. W. Loewenthal, *ibid. for* 1861, *page* 411.

The account given is, unfortunately, extremely meagre. It mentions Buddhas almost innumerable, kings of various sizes, a lady sitting on a lion, playing the lute, reliefs, and elaborate figures of warriors in

all kinds of dresses, sometimes purely Greek, sometimes purely Oriental, sometimes a mixture of the two.

The only work described in detail is the panel with the three Greek soldiers below, and grotesque figures above, which has been noticed in the text (*Section III, page* 135) Mr. Loewenthal states that this slab was "lately brought from Nagram in Yúsufzai by Lieut. Short." He observes that "some pieces of pottery have also been found in the cantonment [*scil.* Pesháwar], stamped with figures of pure Greek designs." I have not seen any such pottery.

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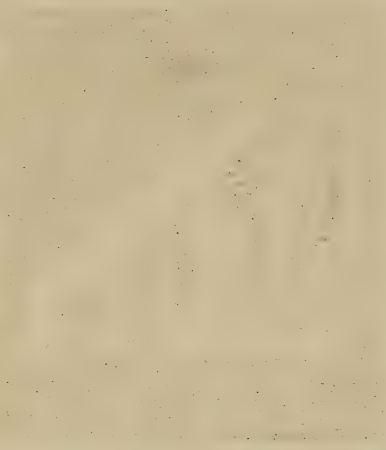
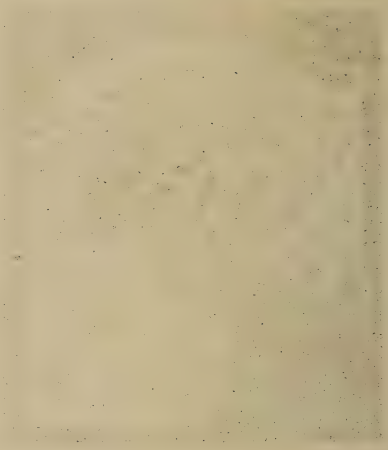
Photo-etching. Survey of India Offices, Calcutta, June 1890.

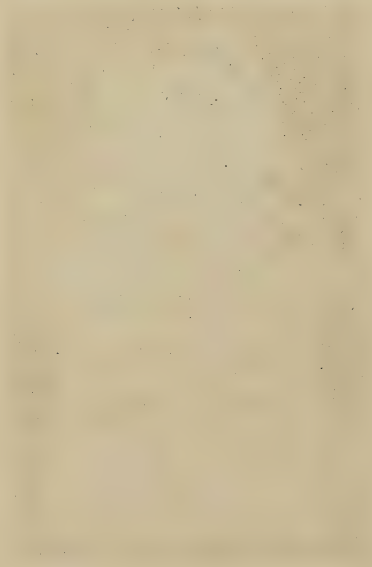
PALLAS ATHÉNÉ, LAHORE MUSEUM.

Photo-etching. Survey of India Offices, Calcutta, June 1890.

THRONED KING. LAHORE MUSEUM.

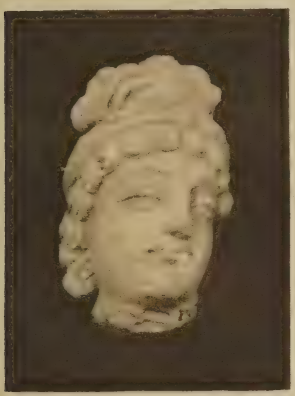




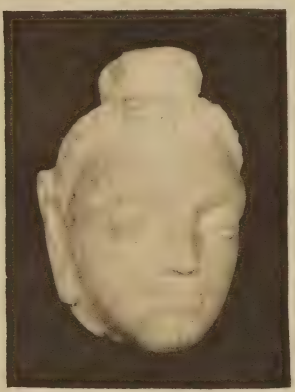


1. BIRTH OF BUDDHA.

4. GIGANTO-MACHIA.



5A. GRECIAN HEAD.



5B. INDIAN HEAD.

2. SEATED BUDDHA.

3. CHAITYA PANEL.

GÁNDHÁRA SCULPTURES.

Photo-etching

Survey of India Offices Calcutta. June 1890.

INSCRIBED PEDESTAL, HASHTNAGAR.

JOURNAL

OF THE

ASIATIC SOCIETY OF BENGAL.

Part I.—HISTORY, LITERATURE, &c.

Supplement, for No. IV.—1889.

*Catalogue of the Central Asiatic Coins, collected by Captain A. F. De Lœssoe, in the Indian Museum, Calcutta.*—*By* Dr. A. F. Rudolf Hoernle.

*(With two plates.)*

The coins which are described in the subjoined catalogue were collected by Captain A. F. de Læssoe on the northern frontier of Afghánistán, in the years 1884 to 1886, during the time of the Afghán Boundary Commission, on which he was employed as Assistant Political Officer.

The coins were, under the orders of the Government of India, made over by him to Mr. Chas. J. Rodgers of the Archæological Survey, for a preliminary examination and report. They were afterwards presented by the Government of India to the Indian Museum, with a request that duplicates, when available, should be given to the Museum in Lahore and to the British Museum in London.

At the request of the Trustees of the Indian Museum, the coins were carefully examined by me and catalogued. Mr. Rodgers' preliminary list proved of great advantage in this work, and most of his readings and many of his remarks are embodied in the following pages.

A large number of duplicates were presented to the Lahore Museum, and a somewhat smaller number to the British Museum. The numbers from which presentations could be made, are indicated by the marks † and ‡.

The collection will be found to be one of considerable interest. A large number of coins, especially of 'Aláu-d-dín Khwárizmí are either entirely new or, at least, have hitherto not been published. The most representative ones of these have been figured in the accompanying plates.

*Abbreviations.*

Ar. Ant. = Dr. Wilson's Ariana Antiqua; B. M. C. = British Museum Catalague; Chron. = E. Thomas' Chronicles of the Pathán kings of Delhi; Ind. Ant. = Prinsep's Indian Antiquities (ed. Thomas); Int. Num. Or. = International Numismata Orientalia; J. A. S. B. = Journal of the Asiatic Society of Bengal; J. R. A. S. = Journal of the Royal Asiatic Society of England; Num. Chron. = the Numismatic Chronicle and Journal of the Numismatic Society of England; Num. Or. = Marsden's Numismata Orientalia; Or. = Oriental; Sass. = E. Thomas' Sassanians in Persia.

*Explanation.*

* prefixed, signifies that the coin is not noted in the existing British Museum Catalogue; † signifies that specimens of the coin have been sent to the British Museum; ‡ signifies that specimens have been sent to the Lahore Museum; *g* signifies that the coin is in good condition, *f*, *t*, *i*, that it is in fair, tolerable or indifferent condition respectively.

CATALOGUE.

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | ROMAN. |
| 1 | 1 | ... | 1 | ... | ... | 42,60 | **Antoninus Pius**. *Obv.*, head of emperor; ....NINUS AU..... *Rev.*, draped female seated on ground, to left. (*i*) |
| 2 | 1 | ... | ... | 1 | ... | 28,13 | **Constantius II**. *Obv.*, head of emperor: CONSTANTIUS AUG. *Rev.*, standard between two armed soldiers: GLORIA EXERCITUS; in exergue SMANZ. (*t*) |
| | | | | | | | GREEK. |
| 3 | 1 | ... | 1 | ... | ... | 47,29 | **Alexander**. Drachm. *Obv.*, head of king. *Rev.*, seated Zeus with eagle. (*i*) |
| 4 | 1 | ... | 1 | ... | ... | 55,83 | **Antiochus**. Drachm. *Obv.*, head of king to right. *Rev.*, Heracles seated; to left [A]NTIOXO[Y], to right [BA]ΣILE[ΩΣ]. *A barbarous copy or forgery with a hole for suspension.* (*t*) |
| | | | | | | | BACTRIAN. |
| 5 | 1 | ... | 1 | ... | ... | 60,92 | **Eukratides**. Drachm. *Obv.*, head of king; border of dots. *Rev.*, Dioscuri mounted; legend ΒΑΣΙΛΕΩΣ ΕΥΚΡΑΤΙΔΟΥ. Type like B. M. C., vol. V, 6. Rare. *This specimen is probably a forgery; the legend is smudged and "basileos" is double-struck. None in B. M. C. of* 1886, *but a specimen lately obtained from Gen. Sir A. Cunningham.* |
| 6 | 1 | ... | ... | 1 | ... | 133,92 | **Soter Megas**. *Obv.*, bust of king. *Rev.*, horseman. Type like Ar. Ant., pl. IX, 12 (with no fillet to lance, and legend ΒΑΣΙΛΕΥ for *βασιλευς*.) (*f*) |
| | | | | | | | INDO-SCYTHIAN. |
| 7 | 1 | ... | ... | 1 | ... | 263,77 | **Kanishka**. *Rev.*, OKPO. Type like Ar. Ant., pl. XII, 17. (*t*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | INDO-SCYTHIAN—*Contd.* |
| 8 | 1 | ... | ... | 1 | ... | 225,55 | **Oerki** (Ooer). *Obv.*, elephant-rider. *Rev.*, MIIOPO (?) Type like B. M. C., No. 153 (p. 155). (*t*) |
| 9 | 1 | ... | ... | 1 | ... | 168,05 | **Do.** A crude variety of No. 8. Type like Ar. Ant., pl. XIII, 20. (*t*) |
| | | | | | | | PARTHIAN. |
| 10 | 1 | ... | 1 | ... | ... | 53,69 | **Mithridates I** (Arsaces VI). Type a in Int. Num. Or., vol. I, pl. I, 26 (Gardner). (*t*) |
| 11 | 1 | ... | 1 | ... | ... | 56,94 | ‡ **Sinatroces** (Arsaces X). Type as in Int. Num. Or., vol. I, pl. III, 2. (*g*) |
| 12 | 1 | ... | 1 | ... | ... | 54,99 | **Orodes I** (Arsaces XII). *Obv.* without crescent, as in Int. Num. Or., vol. I, pl. III, 20. (*f*) |
| 13 | 1 | ... | 1 | ... | ... | 59,22 | ‡ **Do.** *Obv.* with crescent, as in Int. Num. Or., vol. I, pl. III, 23. (*f*) |
| 14 | 1 | ... | 1 | ... | ... | 59,87 | **Do.** *Obv.* with star and crescent, as in Int. Num. Or., vol. I, pl. III, 26. (*f*) |
| 15 | 2 | ... | 2 | ... | ... | 58,10 | ‡ **Phraates IV** (Arsaces XIII). *Obv.* with eagle only, as in Int. Num. Or., vol. I, pl. IV, 6. One has a loop attached to the middle of the obv., to turn the coin into a button, and weighs 59, 85 grains. (*t*) |
| 16 | 1 | ... | 1 | ... | ... | 60,86 | **Do.** *Obv.* with eagle, crescent and star, as in Int. Num. Or., vol. I, pl. IV, 12. (*t*) |
| 17 | 2 | ... | ... | ... | 2 | 58,93 | ‡ **Do.** *Obv.* with Nike, crescent and star, as in Int. Num. Or., vol. I, pl. IV, 11. Apparently a mixture of silver and copper. One is perforated for wearing, and weighs 57,46 grains. (*i*) |
| 18 | 1 | ... | ... | ... | 1 | 56,30 | **Do.** *Obv.* with eagle and crescent. *Rev.* with eagle. Not in Int. Num. Or.; but cf. vol. I, pl. IV, 6. Apparently a mixture of silver and copper. New. (*i*) |
| 19 | 1 | ... | 1 | ... | ... | 55,74 | ‡ **Vonones I** (Arsaces XVII). As in Int. Num. Or., vol. I, pl. V, 4. (*f*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | PARTHIAN—*Contd.* |
| 20 | 1 | ... | 1 | ... | ... | 56,44 | ‡ **Goterzes** (Arsaces XX). As in Int. Num. Or, vol. I, pl. V, 20. (*f*) |
| 21 | 3 | ... | 3 | ... | ... | 55,14 | ‡ **Artabanus IV** (Arsaces XXVI) or **Mithridates IV** (Arsaces XXVII). As in Int. Num. Or., vol. I, pl. VI, 5, 22, 24, 25. Two are perforated for wearing, weighing 55,14 (small hole) and 51,66 (big hole); the third is entire, weighing 52,25 grains. (*f*, *i*, *g*) *The entire one has on the rev. a trace of Mongol over-striking.* |
| 22 | 1 | ... | 1 | ... | ... | 54,66 | **Vologeses IV** (Arsaces XXXI). As in Int. Num. Or., vol. I, pl. VII, 10. (*t*) |
| 23 | 1 | ... | 1 | ... | ... | 44,10 | **Artabanus V** (Arsaces XXXIV). As in Int. Num. Or., vol. I, pl. VII, 19. (*i*) |
| | | | | | | | SUB-PARTHIAN. |
| 24 | 1 | ... | ... | 1 | ... | 85,02 | **Anonymous**. *Obv.*, head of king, to right, with torquis, as in the coins of Arsaces XXIX (Chosroes) in Int. Num. Or., vol. I, pl. VI, 17. *Rev.*, fire-altar as on the early Sassanian coins in Sass., pl. I, 2. Unpublished. (*i*) |
| | | | | | | | SASSANIAN. |
| 25 | 1 | ... | 1 | ... | ... | 63,20 | **Sapor I**. As in Sass., pl. II, 2-6. With a perforation for wearing. (*t*) |
| 26 | 1 | ... | ... | 1 | ... | 162,13 | **Do**. As in Sass., pl. II, 8, 9. (*t*) |
| 27 | 1 | ... | ... | 1 | ... | 192,54 | ‡ **Ardeshir** and **Sapor I**. As in Sass., pl. I, 12. (*i*) |
| 28 | 1 | ... | 1 | ... | ... | 61,95 | ‡ **Sapor II**. As in Sass., pl. IV, 2, 3. (*f*) |
| 29 | 1 | ... | 1 | ... | ... | 49,54 | **Do**. Another variety. As in Sass., pl. IV, 4. (*t*) |
| 30 | 1 | ... | 1 | ... | ... | 62,42 | ‡ **Fírúz I**. As in Sass., pl. V, 8, 9. (*f*) |
| 31 | 1 | ... | 1 | ... | ... | 62,26 | **Khusrú I**, Naushírván. As in Sas., pl. VI, 9. (*g*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SASSANIAN—*Contd* |
| 32 | 2 | ... | 1 | ... | ... | 62,44 | ‡ **Khusrú II**, Parwíz. As in Sass., pl. VI. 14. The less perfect one weighs only 53,01 grains. (*g*) |
| 33 | 1 | ... | 1 | ... | ... | 51,44 | **Do**. Of Arab mintage with *bismillah* on margin; Sass., p. 93. Perforated for wearing. (*f*) |
| 34 | 1 | ... | 1 | ... | ... | 27,61 | **Yezdegird III.** Small sized coin; not in Sass.<br>*A very small piece broken away; otherwise in good condition.* |
| | | | | | | | ABBASIDE. |
| 35 | 1 | ... | 1 | ... | ... | 43,87 | **Al Mansúr**, 2nd Abbaside. Dirham struck in Madínatu-s-Salám, 152 A. H. As in B. M. C., vol. I, 72 (p. 48). (*g*) |
| 36 | 1 | ... | ... | 1 | ... | 96,12 | **Do**. Legends of obv. and rev. areas, as in B. M. C., vol. I, 91 and 104 (p. 196, 201). *Obv.* margin not inscribed, but divided into three sections by three ringlets. *Rev.* marginal legend, indistinctly visible read by Mr. Rodgers بسجستان سنه سبع و اربعين و سبعمايه, *i. e.*, struck in Sijistān, 147 A. H. (*i*) |
| 37 | 1 | ... | 1 | ... | ... | 37,34 | **Harún ar Rashíd**, 5th Abbaside. Dirham struck at Ma'adinu-sh-Shásh, 190 A. H. The same as B. M. C., vol. I, 228, (p. 84). With a loop for suspending. (*t*) |
| 38 | 1 | ... | 1 | ... | ... | 45,72 | **Al Amín**, 6th Abbaside. Dirham, struck at Madínat Balkh, 195 A. H. General type of coin exactly as B. M. C., vol. I, 246, (p. 90), except that there are six ringlets instead of five. (*f*) |
| 39 | 1 | ... | 1 | ... | ... | 29,50 | **Al Mutawakkil**, 10th Abbaside. Fragment (about $\frac{2}{3}$) of a dirham of 24* A. H. Mint lost. General type like B. M. C., vol. I, 317, (plate VI). |
| 40 | 1 | 1 | ... | ... | ... | 54,38 | * **Al Muti'a**, 23rd Abbaside. Dínár struck at Hirát, 369 A. H. (*f*) Plate I, fig. 1. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | ABBASIDE—*Contd.* |
| | | | | | | | *Obv.*, small area within single circle, surrounded by double marginal inscriptions. |
| | | | | | | | *Area :* لا اله الا<br>الله وحده<br>لا شريك له |
| | | | | | | | *Inner legend :* بسم الله ضربهذا الدنار<br>بهراه سنة نسع و ستين و ثلثماية |
| | | | | | | | *Outer legend :* لله [ الامر ] من قبل و<br>[ من بعد و يومئذ يفرح ] المومنون بنصرالله |
| | | | | | | | *Rev.*, area within single circle, surrounded by one marginal inscription. |
| | | | | | | | *Area :* لله<br>محمد رسول الله<br>العظيم الله<br>نوح بن منصور<br>ابوالفتح محمد<br>لله |
| | | | | | | | *Margin :* محمد رسول الله ارسله بالهدى<br>[ و دين الحق ليظهره على الدين كله ] و لو كره<br>المشركون |
| | | | | | | | SHÁH OF KHWÁRIZM. |
| 41 | 1 | 1 | ... | ... | ... | 36,87 | * **'Aláu-d-dín Muhammad bin Takash.** *Type :* on both sides, round areas surrounded by a marginal inscription between single-lined circles. Both margins defective : but on *obv.*, mint Nísábúr legible ; date lost. (*t*) Plate I, fig. 2. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWÁRIZM.—*Contd.* |
| | | | | | | | *Obv.* لا الله الا الله ○ الله محمد ○ رسول الله الناصرلدين الله |
| | | | | | | | *Rev.* الله السلطان الاعظم علاء الدنيا والدين ابو المظفر تكش بن خوارزمشاه |
| | | | | | | | *Margins:* fragmentary; *obv.* نيسا بور ..... ..... سنه |
| 42 | 1 | 1 | ... | ... | ... | 33,57 | **Do.** Duplicate of No. 41, but double struck on both sides. Obverse margin fragmentary, showing only date 5**; reverse margin gone. (*i*) |
| | | | | | | | *Obv. margin:* بسم الله ..... خمس مايه |
| 43 | 1 | 1 | ... | ... | ... | 44,37 | **Do.** Duplicate of No. 41; but struck on rev. side only, margin entirely gone. (*i*) |
| 44 | 2 | 2 | ... | ... | ... | 26,95<br>16,08 | ‡ * **Do.** *Type:* same as No. 41; but different reverse legend; and no ringlets on obv. Margins nearly gone. (*t*) |
| | | | | | | | *Rev.* الله السلطان الاعظم على الدنيا و الدين ابوالفتح محمد بن السلطان تكش |
| 45 | 1 | 1 | ... | ... | ... | 36,34 | **Do.** Duplicate of No. 44; but double struck on reverse side. Margins defective and illegible. (*i*) |
| 46 | 1 | 1 | ... | ... | ... | 23,00 | ‡ **Do.** Duplicate of No. 44; but struck on reverse side only. Margin nearly gone. (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF ḴHWARIZM—*Contd.* |
| 47 | 1 | 1 | ... | ... | ... | 32,62 | **Do.** Duplicate of No. 44; but double struck on rev. side, and struck on that side only. Margin gone. (*t*) |
| 48 | 4 | 4 | ... | ... | ... | 44,37 | ‡ **Do.** Duplicate of No. 44; but struck on obv. side only, on which there are no ringlets. One perforated specimen weighs 25,06; two others weigh 20,91 and 18,49 grains respectively. Margins defective and illegible. (*i*) |
| 49 | 1 | 1 | ... | ... | ... | 47,81 | **Do.** *Type:* similar to No. 41, with reverse legend similar to No. 44; and on obv. side letters in place of ringlets. Both legends much blundered. Margins gone. (*i*) |

| *Obv.* | *Rev.* |
|---|---|
| | فنك |
| لا اله الا | السلطا لاعظم (sic) |
| اله محمد د | علا الدنيا و الدين |
| رسو اله (sic) | ابو الفتح محمد |
| الناضر لدله (sic) | طسو S (broken). |
| ∴ | ش (broken). |

Mr. Rodgers reads قنك on *rev.*

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 50 | 1 | 1 | ... | ... | ... | 64,07 | * **Do.** Two round areas with marginal inscriptions within single-lined circles, as in No. 41; but legends different, also characters different, *i. e.*, nasta'líq, as in the early Paṭhán coins of India, not Kufic. One half of the coin is broken away. Reverse margin shows 6**. (*i*) |

| *Obv.* | *Rev.* |
|---|---|
| لا..... | السلطان |
| محمد..... | ...ظم علا الد |
| الناضر..... | .....الفتح |
| امير الم... | ..... |

*Rev. margin:* ستمايه.....

*Obv. margin:* .....الدين الحق.....

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF ḴHWARIZM—*Contd.* |
| 51 | 18 | ... | ... | ... | 18 | 35,58 | * † ‡ **Do.** *Type* I, obv., saddled horse with mint, within single-lined circle; sometimes three dots under horse; rev. inscription within singled-lined circle. One specimen was assayed by Dr. Scully with the result: copper 80·9 per cent., lead 13·5, silver 5·6. (*t*) Plate I, fig. 3. The mint is read by Mr. Rodgers *Balúqán or Talúqán.* *Obv.* بلوقان Horse ∴ *Rev.* السلطان ا لاعظم علاء ا لدنيا والدين محمد بن السلطان |
| 52 | 16 | ... | ... | ... | 16 | 35,58 | * **Do.** *Type* I, similar to No. 51, same mint, but rev. legend differently arranged. *Rev.* السلطان الاعظم علاء ا لدنيا والدين محمد بن السلطان |
| 53 | 5 | ... | ... | ... | 5 | 35,58 | * **Do.** *Type* I, similar to No. 51; same mint, but rev. legend differently arranged. *Rev.* السلطان الا عظم علاء الد نيا و الدين محمد بن السلطان |
| 54 | 1 | ... | ... | ... | 1 | 34,44 | * **Do.** *Type* I. Apparently similar to No. 51, but double-struck on both sides. (*i*) |
| 55 | 4 | ... | ... | ... | 4 | 37,89 | * † ‡ **Do.** *Type* II. Obv., horseman with lance at charge; *Variety* 1, semicircle over head of rider; some dots here and there; name of mint above right of rider. Rev., inscription only. Both obv. and rev. en- |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWARIZM—*Contd.* |
| | | | | | | | closed within double circle, the inner lined, the outer dotted. Mint *Ṭáliqán* both on obv. and rev. (*i*) Plate I, fig. 4. |
| | | | | | | | *Obv.* طالقان *Rev.* طالقان (in minute letters). السلطان الاعظم علا الد or السلطان الاعظم علا الد نيا و الدين محمد بن السلطان |
| | | | | | | | Occasionally the rev. legend is aranged, as on No. 51. |
| 56 | 4 | ... | ... | ... | 4 | 39,74 | * † ‡ **Do.** *Type* II, *Variety* 2, in all respects like No. 55, except that there is a bird to right below horse, instead of the dots. (*t*) |
| 57 | 1 | ... | ... | ... | 1 | 41,00 | * **Do.** *Type* II, *Variety* 3, similar to No. 55, but without semicircular corona, and a trefoil in the place of the bird. Inscriptions on obv. and rev. exactly as on No. 55. (*t*) |
| 58 | 2 | ... | ... | ... | 2 | 39,78 | * † ‡ **Do.** *Type* II, *Variety* 4, bow-like canopy over head of rider; crescent above over left side, and mint above over right side of rider. Rev., inscription. Both obv. and rev. enclosed within double circle, the inner lined, the outer dotted. Mint سفو (*Shafúrqán?*) or سلو? (*t*) |
| | | | | | | | *Rev.* السلطان الاعظم علا الدنيا و الدين محمد بن السلطان |
| 59 | 2 | ... | ... | ... | 2 | 33,60 36,37 | * **Do.** *Type* II, *Variety* 5, similar to No. 53, but bare head; crescent with dot to left and dot to right of it. Rev., inscription exactly as on No. 58. Both obv. and rev. enclosed within a single-lined circle. Mint سلو or سفو? (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWARIZM—*Contd.* |
| 60 | 1 | ... | ... | ... | 1 | 40,09 | * **Do.** *Type* II, *Variety* 6, similar to No. 59, but without crescent and dots, and with some indistinct object below horse. Rev. inscription as on No. 58. (*i*) |
| 61 | 8 | ... | ... | ... | 8 | 42,06 | * † ‡ **Do.** *Type* II, *Variety* 7, similar to No. 58, but only with bow-like canopy. Rev., inscription as on No. 58, but below it an illegible mint-name. Both obv. and rev. either within a single serrated circle, or within a double circle, the inner lined, the outer dotted. (*i*) |
| 62 | 2 | ... | ... | ... | 2 | 27,36 | * **Do.** *Type* III. Obv., horseman with waving arms, without lance. *Variety* 1, bird sitting to left below horse. Rev., inscription, nearly obliterated. Obv. and rev. within double lined circle. (*b*) |
| 63 | 2 | ... | ... | ... | 2 | 34,42 | * † ‡ **Do.** *Type* III, *Variety* 2, like No. 62, but bird turned to right. Mint *Ṭáliqán*, visible on obv. over right side of horse. (*i*) |
| 64 | 3 | ... | ... | ... | 3 | 37,09 | * † ‡ **Do.** *Type* III, *Variety* 3, a beetle-like mark under horse; mint over right side of horse. Rev., inscription. Both obv. and rev. enclosed within double-lined circles. Mint *Ṭáliqán* both on obv. and rev. Legends, on both sides, read and are arranged exactly as on No. 55. (*i*) |
| 65 | 16 | ... | ... | ... | 16 | 35,97 | * † ‡ **Do.** *Type* III, *Variety* 4, a star, 5 or 6 rayed, under horse; mint over right of horse. Rev., inscription. Obv. enclosed within double circle, the inner lined, the outer dotted; rev. within single-lined circle. Mint *Ṭáliqán* both on obv. and rev. Legends as on Nos. 55 and 63. Plate I, fig. 5. (Some *t*) |
| 66 | 2 | ... | ... | ... | 2 | ..... | * **Do.** *Type* III, *Variety* 5, in all respects like No. 65, except the rev. legend which reads as follows: (*t*)<br>طالقان (in minute letters.)<br>السلطان<br>الاعظم محمد<br>بن السلطان |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF KHWARIZM—*Contd.* |
| 67 | 2 | ... | ... | ... | 2 | 34,55 | * **Do.** *Type* III, *Variety* 6, like No. 64 in all respects, except the mark under the horse which looks like an anvil (?). (*i*, *b*) |
| 68 | 1 | ... | ... | ... | 1 | 41,28 | * **Do.** *Type* III, *Variety* 7, like No. 65 except that the mark under the horse is a snake, and the rev. legend arranged as on No. 52. (*t*) |
| 69 | 2 | ... | ... | ... | 2 | 36,52 | * † ‡ **Do.** *Type* III, *Variety* 8, like No. 62, except that there is no mark under the horse. (*b*) |
| 70 | 2 | ... | ... | ... | 2 | ..... | * **Do.** *Type* III, *Variety* 9, no mark under horse, which is galloping. Both obv. and rev. enclosed within double circle, the inner lined, the outer dotted. Rev. legend as follows: (*i*)<br>[ السلطان ] (cut away.)<br>الا عظم ابو الفتح<br>محمد بن السلطان |
| 71 | 1 | ... | ... | ... | 1 | 41,91 | * **Do.** *Type* IV. Obv., horseman with leafed branch in left hand. Mint doubtful over left side of horse, and bird under horse. Both obv. and rev. enclosed within double circle, the inner lined, the outer dotted. Plate I, fig. 6. (*t*)<br>*Obv.* زميندار (?)<br>*Rev.* السلطان الا عظم ابو الفتح محمد بن السلطان |
| 72 | 5 | ... | ... | ... | 5 | 47,25 | * † ‡ **Do.** *Type* V, horseman with shouldered sword. *Variety* 1, bare head; mint over right side of horse; below it a flower. Rev., inscription. Mint *Hirát*. Both obv. and rev. within three circles, a dotted one between two lined ones. Plate I, fig. 7. (*t*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF KHWARIZM—*Contd.*<br>*Obv.* هزاره *Rev.* السلطان or الاعظم محمد بن السلطان rarely السلطان بن الاعظم محمد |
| 73 | 6 | ... | ... | ... | 6 | 45,38 | * † ‡ **Do.** *Type* V, *Variety* 2, like No. 72, except that there is no flower below the horse. (*i*) |
| 74 | 3 | ... | ... | ... | 3 | 35,52 | * † ‡ **Do.** *Type* V, *Variety* 3, like No. 73, but the mark under horse indistinguishable; canopy over head of rider and mint Balkh بلخ (?) (*i*) |
| 75 | 6 | ... | ... | ... | 6 | 46,72 | * † ‡ **Do.** *Type* VI, Obv., horseman with shouldered flag; bare head; no mint. Rev., inscription in Kufic characters. Both obv. and rev. enclosed within three circles, a dotted one being between two lined ones. Plate I, fig. 8. One specimen was assayed by Dr. Scully with the result: copper 2·2 per cent., silver 7.4, lead 85·4. (*t*)<br>*Rev.* محمد بن السلطان نكش |
| 76 | 7 | ... | ... | ... | 7 | 36,88 | * † ‡ **Do.** *Type* VII, bare elephant to left. *Variety* 1, Obv., a saw-like mark below, and a mint-name above elephant. Rev., inscription. Both obv. and rev. within double circle, the outer dotted, the inner lined. One specimen was assayed by Dr. Scully with the result: per cent. copper 39·2, silver 8·0, lead 52·7. (*i*)<br>*Obv.* سعرة (?) *Rev.* as on No. 58. |
| 77 | 16 | ... | ... | ... | 16 | 41,23 | * † ‡ **Do.** *Type* VII, *Variety* 2, similar to No. 76, but no mark below elephant, and mint and inscription different. (*t*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWARIZM—*Contd.* |
| | | | | | | | *Obv.* حابروان (?) *Rev.* as on No. 66. (but without the mint). |
| 78 | 1 | ... | ... | ... | 1 | 34,50 | * **Do.** *Type* VII, *Variety* 3, similar to No. 77, but different mint and inscription. (*i*) |
| | | | | | | | *Obv.* كرلروان (?) *Rev.* apparently as in No. 58. |
| 79 | 3 | ... | ... | ... | 3 | 34,50 | * **Do.** *Type* VII, *Variety* 4, similar to No. 77, but different mint and inscription. (*i*) |
| | | | | | | | *Obv.* شفورقان [*Shufúrqán.*] *Rev.* as on No. 52. |
| 80 | 3 | ... | ... | ... | 3 | 34,50 | * † ‡ **Do.** *Type* VII, *Variety* 5, similar to Nos. 77, 79, but different mint and inscription (2 *i*, 1*f*). Plate I, fig. 9. |
| | | | | | | | *Obv.* سلورقان (?) *Rev.* السلطان الا عظم علا الدنيا و الدين محمد سلطان |
| 81 | 3 | ... | ... | ... | 3 | 32,13 | * † ‡ **Do.** *Type* VII, *Variety* 6, similar to No. 76; but the mark below is an arabesque; the mint above is the same without the final ٨; rev. inscription different. (*t*) |
| | | | | | | | *Obv.* سمر or سعر (*Samarqand ?*) *Rev.* السلطا ن الا عظم علا الدنيا و الدين محمد بن سلطان |
| | | | | | | | *N. B. What looks like a mint name, may be only an arabesque ornamental mark.* |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHAH OF KHWARIZM—*Contd.* |
| 82 | 4 | ... | ... | ... | 4 | 33,01 | * † ‡ **Do.** *Type* VII, *Variety* 7, similar to No. 81, but arabesque mark above and three dots in line below elephant. Rev. inscription different; *viz.*, (*t*) السلطا ن الا عظم علا الدنيا و الدين |
| 83 | 19 | ... | ... | ... | 19 | 33,58 | * † ‡ **Do.** *Type* VII, *Variety* 8, exactly as No. 82, but a different rev. inscription. (3 *f*) *Rev.* السلطان ا لا عظم علا الدنيا والدين محمد بن سلطان or السطان الا عظم علا (on one) الدنيا والدين محمد بن سلطان |
| 84 | 14 | ... | ... | ... | 14 | 35,32 | * † ‡ **Do.** *Type* VIII, bare elephant to right. *Variety* 1, obv., mint above elephant; rev., inscription. Both obv. and rev. within double circle, outer dotted, inner lined. (*i* or *b*) *Obv.* (both in Kufic) كرمان (similar to No. 78) *Rev.* السلطان الا عظم علا الدنيا والد ين محمد بن سلطان |
| 85 | 3 | ... | ... | ... | 3 | 35,32 | * **Do.** *Type* VIII, *Variety* 2, exactly as No. 84, but style of letters of obv. mint somewhat different. (1 *t*). Plate I, fig. 10. |
| 86 | 4 | ... | ... | ... | 4 | 35,32 | * **Do.** *Type* VIII, *Variety* 3, exactly as No. 84, but style of letters of obv. mint slightly indifferent. (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF KHWARIZM—*Contd.* |
| 87 | 3 | ... | ... | ... | 3 | 38,91 | * **Do.** *Type* IX, bare elephant to right, with fettered legs. *Variety* 1, obv., mint over elephant; rev., inscription. Both obv. and rev. within double circle, the outer dotted, the inner lined. (1 *f*). Plate I, fig. 11.<br>*Obv.* كرنروان (as on No. 85)<br>*Rev.* السلطان الاعظم علا الدنيا والدين محمد بن سلطان |
| 88 | 12 | ... | ... | ... | 12 | 38,91 | * † ‡ **Do.** *Type* IX, *Variety* 2, exactly as No. 87, but style of letters of obv. mint slightly different. (*i*, *some t*)<br>*Obv.* كرنروان (as on No. 85.)<br>*Rev.* (as on No. 87). |
| 89 | 12 | ... | ... | ... | 12 | 38,91 | * † ‡ **Do.** *Type* IX, *Variety* 3, similar to No. 88, but inscription different. (*i*, one *t*)<br>*Obv.* كرنروان (as on Nos. 89, 84.)<br>*Rev.* (as on No. 84.) |
| 90 | 2 | ... | ... | ... | 2 | 38,91 | * **Do.** *Type* IX, *Variety* 4, exactly as No. 89, but style of letters of obv. mint slightly different. (*i*)<br>*Obv.* كرنروان (as on Nos. 85, 87).<br>*Rev.* (as on Nos. 84, 89). |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF KHWARIZM—*Contd.* |
| 91 | 1 | ... | ... | ... | 1 | 42,81 | * **Do.** *Type* X, elephant-rider with lance at charge, to left. *Variety* 1, obv., mint below elephant; rider bare-headed. Rev., inscription. Both obv. and rev. within double circle, outer dotted, inner lined. (*t*) Plate I, fig. 12. *Obv.* ? حردروان *Rev.* السلطا ن الاعظم علا الدنيا والدين محمد بن سلطا ن |
| 92 | 1 | ... | ... | ... | 1 | 38,43 | * † ‡ **Do.** *Type* X, *Variety* 2, similar to No. 91, but on obv. no mint; bow-like canopy over rider's head; dot over elephant's head; rev. legend different. (*i*) Plate I, fig. 13. Rev. legend, as on No. 83. |
| 93 | 20 | ... | ... | 20 | ... | 47,58 45,11 | † ‡ **Do.** *Type* XI, lettered surfaces, within circles. *Variety* 1, as in B. M. C., vol. II, Nos. 596—600 (see Plate VII, fig. 599). (*t, some f*) |
| 94 | 1 | ... | ... | 1 | ... | 34,92 | **Do.** *Type* XI, *Variety* 2, as in B. M. C., vol. II, No. 594. (*t*) |
| 95 | 3 | ... | ... | 3 | ... | 43,25 | * ‡ **Do.** *Type* XI, *Variety* 3. Obv. and rev. within double circle, outer dotted, inner lined. On obv., two annulets on each side of the inscription; also on rev. in diverse places. (*i*) *Obv.* السلطان : الا عظم : ابوالفتح *Rev.* محمد بن السلطان تكش |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHA'H OF KHWARIZM.—*Contd.* |
| 96 | 1 | ... | ... | 1 | ... | 42,42 | **Do.** *Type* XI, *Variety* 4. Obv., kalimah; rev. illegible. (*i*) |
| 97 | 2 | ... | ... | 2 | ... | 41,11<br>37,00 | * ‡ **Do.** *Type* XII, small inner circular area on obv.; lettered surface on rev.; both rev. and obv. within double circle, outer dotted, inner lined. *Variety*, 1, Muḥammad in Kufic in area, with dot above. Plate I, fig. 14. (*t*)<br>*Obv.* / *Rev.*<br>*Area:* محمد / السلطان الا<br>*Margin:* لا اله الا الله *above* / عظم علا اله<br>الناصرا *left* / نيا والدين محمد<br>(*sic*) رسو الله *below* / بن السلطان<br>لدين الله *right.* |
| 98 | 1 | ... | ... | 1 | ... | 52,53 | * **Do.** *Type* XII, *Variety* 2, inner area formed by a double circle; within, an illegible mint name. (*i*)<br>*Obv.* / *Rev.*<br>*Area:* ـــ... / ابو<br>*Margin:* / الفتح محمد<br>السلطان الاعظم / بن السلطان<br>علا الدنيا والدين / نكش |
| 99 | 3 | ... | ... | 3 | ... | 44,88 | * **Do.** *Type* XII, *Variety* 3, inner area formed of three circles, a dotted between two lined; within, a sexagonal rose or star. Published by W. Rodgers in J. A. S. B. vol. LII (1883), p. 57, No. 15 on Plate IV. (*i*) |
| 100 | 1 | ... | ... | 1 | ... | 47,60 | * **Do.** *Type* XII, *Variety* 4, like No. 99 in every respect, except that rev. legend differently arranged. (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWARIZM.—*Contd.* |
| | | | | | | | *Rev.* ابوالفتح بن السلطان [ تكش ] (*lost*) |
| 101 | 3 | ... | ... | 8 | ... | 45,37 | * ‡ **Do.** *Type* XIII, a small inner circular area on both obv. and rev.; the latter are both surrounded by a double circle, outer dotted, inner lined. *Variety* 1, both inner areas formed by three circles, a dotted between two lined; within, mint *Zamín-dáwar*. (*i*) Plate I, fig. 15 *a* and *b*. *Obv.* *Margin*: السلطان الاعظم علاء الدنيا والدين *Area*: داور *Rev.* *Margin*: ابوالفتح بن السلطان تكش *Area*: ز مين |
| 102 | 1 | ... | ... | 1 | ... | 38,60 | * **Do.** *Type* XIII, *Variety* 2, like No. 100 in every respect, except that the circles forming the inner area are wider apart from one another, thus causing the margin to be narrower. Legends as in No. 101. (*i*) |
| 103 | 2 | ... | ... | 2 | ... | 41,99 | * **Do.** *Type* XIII, *Variety* 3, obv. area formed by two lined circles; rev. area by three circles, a dotted between two lined; within both areas a boss. (*i*) *Obv.* *Marg.*: السلطان الاعظم علاءالدنيا والدين *Area*: boss *Rev.* *Marg.*: ابوالفتح محمد بن السلطان تكش *Area*: boss |
| 104 | 1 | ... | ... | 1 | ... | 52,08 | * **Do.** *Type* XIV, two-lined square areas occupying whole of obv. and rev. faces; segments inscribed. Almost illegible. (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHAH OF KHWARIZM.—*Contd.* |
| | | | | | | | *Obv.* Area: لا اله [ الا الله ] محمد [ رسول ] الله — *Rev.* Area: [ السلطان الا ] عظم علا الدنيا والدين |
| 105 | 2 | ... | ... | 2 | ... | 44,23<br>39,98 | * ‡ **Do.** *Type* XV, on the obv. and rev., square areas enclosed within double circle, the outer dotted, the inner lined. *Variety* 1, ornamental scrolls in the sections, between the squares and circles. Published by W. Rodgers in J. A. S. B., vol. LII, p, 57, on Plate IV, fig. 14. The last line of the obv. legend, wanting in his specimen, was doubtfully supplied as being *'Aláu-d-dín*, but it is really *Abu-l-Fath*, as shown clearly on the present specimens. (*t*) |
| | | | | | | | *Obv.* السلطان الاعظم ابوالفتح — *Rev.* محمد بن السلطان تكش |
| 106 | 1 | ... | ... | 1 | ... | 43,36 | * ‡ **Do.** *Type* XV, *Variety*, 2, inscriptions in sections; on rev., date 61* in words; on obv., illegible mint (?). Plate I, fig. 16. (*t*) |
| | | | | | | | *Obv.* ..... السلطان الاعظم ابوالفتح ..... — *Rev.* سنه محمد بن السلطان تكش سنه ستين |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHAH OF KHWARIZM.—*Contd.* |
| 107 | 2 | ... | ... | 2 | ... | 44,24 | * **Do.** *Type* XVI, on both obv. and rev., two hexagonal areas intercrossing, with three dots in each section. Mint Farwán. Published by W. Rodgers in J. A. S. B., vol. LII, p. 57, on Plate IV, fig. 12. |
| 108 | 1 | ... | ... | 1 | ... | 40,65 | **Do.** *Type* XVII, obv., lettered surface within double circle, outer dotted, inner lined. Rev., small double-lined square inner area; within, figure of horseman, outside inscription. As in B. M. C. of Or. Coins, vol. II, p. 186, onPlate VII, fig. 603. (*i*) |
| 109 | 1 | ... | ... | 1 | ... | 57,17 | * ‡ **Do.** *Type* XVIII, large thin piece obv., circular area; rev., double-lined square area. In marginal sections, apparently, mint Ghaznah. Plate II, fig. 17. (*t*)<br>*Obv.* *Area:* السلطان الا عظم علا الدنيا والدين ابو لفتح *Margin:* Ornaments.<br>*Rev.* *Area:* السلطان بن سلطان امير المومينين *Sections:* ornmt., *r. and l.* ضرب *above.* غزنه *below.* |
| 110 | 1 | ... | ... | ... | 1 | 43,50 | * **Do.** Doubtful. *Type* XIX; obv., horseman to right, with lance at charge, within double circle, outer dotted, inner lined. Rev., inscription within single dotted circle; nearly illegible. Mr. Rodgers observes: "This is the only coin out of about 3,000, which has the horseman to the right." |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | SHÁH OF KHWARIZM.—*Contd.* |
| 111 | 1 | ... | ... | 1 | ... | 34,85 | * **Do.** doubtful. *Type* XX; obv., maned lion standing to left, below a dot, above mint *Shafúrqán*. Rev., inscription within lined circle, nearly obliterated. *Obv.* شفورقان *Rev.* ..... ..... سلطان |
| | | | | | | | GHAZNAWÍS AND GHORÍS, ETC. |
| 112 | 1 | ... | 1 | ... | ... | 58,63 | **Masa'úd I.** Two circular areas and margins, as in B. M. C. of Or. Coins, vol. II, No. 524 (p. 157), but barely legible. (*i*) |
| 113 | 1 | 1 | ... | ... | ... | 82,70 | * **Farukhzád ibn Masa'úd.** Similar to No. 546 in B. M. C. of Or. Coins, vol. II, p. 166; but star (six-rayed) at top of rev. area, and *ẓafar* (ظفر, so W. Rodgers) at top of obv. area; date 448; the remainder identical. The outer marginal legend of obv. is nearly gone; that on reverse much cut and obliterated. (*f*) |
| 114 | 1 | ... | ... | ... | 1 | 45,56 | **Ibrahím ibn Masa'úd**; with Bull rev., and lettered surface on obv., as in B. M. C. of Or. Coins, vol. II, No. 561 (p. 172), and in Proceedings, A. S. B., for 1881, p. 6. (*t*) |
| 115 | 1 | ... | ... | 1 | ... | 45,69 | **Undetermined.** Probably Ghaznawí. Legends illegible; but on right hand side of the legend in the area, there is a perpendicular mark, which is indistinguishable on the obv., but clearly ⊦ on the rev. Compare similar marks on Maḥmúd's coin, Pl. V, No. 458 in B. M. C., vol. II, p. 131. (*i*) |
| 116 | 1 | 1 | ... | ... | ... | 41,55 | * **Ghiyásu-d-dín Muhammad bin, Sám.** Two circular areas; both margins entirely obliterated. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | GHAZNAWIS AND GHORIS.—*Contd.* |
| | | | | | | | *Obv.* السلطان الا عظم / عياث الدنيا و الدين / ابو المظفر محمد / بن سام حسلو (?) / ..... (illegible) — *Rev.* لا اله الا / الله محمد / رسول الله / الناصر الدين / ..... |
| | | | | | | | Mr. Rodgers reads on the obv. doubtfully حسلو or قشلو. Plate II, fig. 18. |
| 117 | 1 | 1 | ... | ... | ... | 267,35 | **Do.** Same type, but much heavier, than No. 6 in J. A. S. B., vol. LII, p. 56 (Pl. IV, fig. 6). Without mint; but date 600 A. H. The rev. margin, as Mr. Rodgers observes, gives a quotation from the Qurán, Surah IX, 33, هوالذي ارسل رسوله بالهدى و دين الحق ليظهره على الدين كله [ ولو كره المشركون ] the concluding portion of which, *viz.* that within brackets, is never given on these gold coins. (*g*) |
| 118 | 1 | 1 | ... | ... | ... | 232,80 | * **Do.** Very similar to No. 117, but with mint Ghaznah, and same date 600 A. H. (*g*) |
| 119 | 1 | 1 | ... | ... | ... | 134,73 | * **Do.** The same as No. 117, except in the matter of weight; also without mint. Its date is 600 A. H. (*f*) |
| 120 | 1 | 1 | ... | ... | ... | 181,51 | **Do.** Same type, as No. 117, but of smaller size; date 603 A. H., mint obliterated (Ghaznah ?). (*t*) |
| 121 | 1 | 1 | ... | ... | ... | 122,76 | **Do.** Same as No. 120, except in the matter of weight. Mint Ghaznah; date obliterated (600 ?). |
| 122 | 2 | ... | ... | ... | 2 | 43,86<br>42,78 | **Do.** *Type:* Turkí horseman, exactly as published, by Mr. Rodgers, in J. A. S. B., vol. LII, p. 55 (Pl. IV, fig. 1.) (1 *t*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | GHAZNAWÍS AND GHORÍS—*Contd.* |
| 123 | 2 | ... | ... | ... | 2 | 56,68<br>45,45 | **Do.** Doubtful. Inscribed circular areas.<br>*Obv.* سلطان لاعظم ع[ياث]<br>.....<br>*Rev.* ضرب... |
| 124 | 1 | 1 | ... | ... | ... | 116,13 | * **Ghiyásu-d-dín** and **Muizzu-d-dín bin Sám.** Type the same as in No. 117. A silver coin of this type has been published by Dr. Stülpnagel in J. A. S. B., vol. XLIX, p. 31 (Pl. IV, No. III). It shows no mint, but bears the date 599 A. H. (*f*) |
| 125 | 1 | 1 | ... | ... | ... | 45,72 | * **Do.** *Type*, four concentric circles, exactly as in the silver dirhem, published by Dr. Stülpnagel, in J. A. S. B., vol. XLIX, p. 30 (Pl. IV, No. II). No mint; but date 599 on the rev. with Muizz' name. (*t*) |
| 126 | 2 | ... | ... | ... | 2 | 45,95<br>42,52 | **Muizzu-d-dín** and **Táju-d-dín Ildaz.** Published by Mr. Rodgers, in J. A. S. B, vol. XLIX, p. 210 (Pl. XVIII, No. 17). See also Ar. Ant. Pl. XX, fig. 18. (*t*) |
| 127 | 1 | ... | ... | ... | 1 | 50,96 | ‡ **Muizzu-d-dín bin Sám.** *Type*, Turkí horseman; exactly as in Chron., p. 15, No. 6 (Pl. I, fig. 5). (*t*) |
| 128 | 1 | ... | ... | ... | 1 | 48,19 | **Do.** *Type*, Rájpút horseman; exactly as in Chron., p. 15, No. 5, (Pl. I, fig. 4). (*t*) |
| 129 | 7 | ... | ... | ... | 7 | 55,06 | ‡ **Do.** *Type*, bull and horseman, exactly as in Chron., p. 15, No. 10, (Pl. I, fig). (*t*) |
| 130 | 1 | ... | ... | 1 | ... | 37,44 | * **Do.** *Type*, on both obv. and rev., an inscribed hexagon formed by two interlacing equilateral triangles. (*t*)<br>*Obv.* السلطان (؟)<br>*Rev.* محمد بن سام |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | GHAZNAWÍS AND GHORÍS—*Contd.* |
| 131 | 1 | ... | ... | 1 | ... | 43,51 | **Do.** *Type*, circular areas, enclosed in dotted ring, exactly as published, by Mr. Rodgers, in J. A. S. B., vol. XLIX, p. 81, (Pl. V, fig. 6). (*t*)<br>*Obv.* عدل *Rev.* معز |
| 132 | 1 | ... | ... | ... | 1 | 47,85 | ‡ **Ghiyásu-d-dín Mahmúd bin Muhammad bin Sám.** *Type*, Rájpút horseman, exactly as in Chron. p. 32, No. 25, and Journal R. A. S., vol. IX, p. 177. |
| 133 | 1 | ... | ... | ... | 1 | 40,59 | * † ‡ **Do.** *Type*, elephant rider to left. *Variety* 1, similar to No. 91, but without lance at charge; with goad (*ankus*) in right hand. Plate I, fig. 19. (*f*)<br>*Rev.* السلطان الاعظم غيا ث الدنيا و الدين ابوالفتح محمو د بن محمد سام |
| 134 | 1 | ... | ... | 1 | ... | 38,85 | * **Do.** *Variety* 2, the same as No. 133 in all respects, except slightly different arrangement of rev. inscription. (*i*)<br>*Rev.* السلطان الاعظم غياث الدنيا و الدين ابوالفتح محمو ] / [ د بن محمد سام } lost. |
| 135 | 1 | ... | ... | 1 | ... | 42,06 | * **Do.** *Variety* 3, similar to No. 133; but bow-like canopy over rider, and slightly different rev. inscription. (*t*)<br>*Rev.* السلطا ن الاعظم غيا ث الدنيا و الدين محمود بن / محمد سام } much worn. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | GHAZNAWĪS AND GHORĪS—*Contd.* |
| 136 | 1 | ... | ... | 1 | ... | 37,10 | * † ‡ **Do.** *Variety* 4, similar to No. 133, but with lance at charge, and somewhat different rev. inscription. (*f*) *Rev.* السلطان الاعظم ابو الفتح محمود بن محمد سام |
| 137 | 1 | ... | ... | 1 | ... | 51,18 | **Tāju-d-dín Ildaz.** *Type*, Turkí horseman, as published by Mr. Rodgers, in J. A. S. B., vol. LII. p. 55 (Pl. IV, fig. 2). (*t*) |
| 138 | 5 | ... | ... | 5 | ... | 51,05 | ‡ **Do.** *Type:* Rájpút horseman, as in Ar. Ant., Pl. XX, fig. 9. (*t*) |
| | | | | | | | NĪSABŪRĪ AMĪRS. |
| 139 | 1 | 1 | ... | ... | ... | 31,24 | ‡ **Tughán Sháh.** Circular areas with inscribed margins, as in B. M. C. of Or. Coins, vol. III, No. 313 (Pl. VI, fig. 313). Mint obliterated, date 57*. (*t*) *Obv. margin:* بسم الله.....و سبعين خمسمايه |
| 140 | 1 | 1 | ... | ... | ... | 26,15 | ‡ **Do.** Same type as No. 139, but otherwise as in B. M. C. of Or. Coins, vol. III, No. 314. Mint and date lost. (*i*) |
| | | | | | | | BENĪ ZENGĪ AṬABEGS OF MOSIL. |
| 141 | 1 | 1 | ... | ... | ... | 87,23 | * **Badru-d-dín Lúlú.** Mint Moṣil, date 650; in every respect like No. CLXXX in Num. Or., p. 170, (Pl. X). It differs from B. M. C., vol. III, No. 574 (Pl. X) only in the omission of the word و سلم in the second line of the rev. area inscription, and in the date. (*g*) |
| | | | | | | | GREAT SELJŪQĪS. |
| 142 | 1 | ... | ... | 1 | ... | 48,36 | **Muhammad.** Lettered surfaces, enclosed within double lined circles. The obv. is marked with *fatḥ*, the rev. with |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | GREAT SELJUQIS—*Contd.* |
| | | | | | | | *'adl*, as in B. M. C., vol. III, No. 67, p. 34, 35. (*i*) |
| | | | | | | | *Obv.* فتح / لا اله الا / الله محمد / [رسول الله] *Rev.* عدل / Rest illegible. |
| | | | | | | | RUMI SELJUQIS. |
| 143 | 1 | ... | 1 | ... | ... | 42,58 | **Ghiyásu-d-dín Kai-Khusrú** II. *Type:* obv., sun over lion to right; rev. inscription, exactly as in B. M. C. of Or. Coins, vol. III, No. 225. With a small hole near the margin for wearing. (*g*). |
| | | | | | | | MALIKS OF SIJISTAN. |
| | | | | | | | *N. B. On these Maliks, see Major Raverty's translation of the Ṭabaqát-i-Náṣirí, pp.* 183-202. |
| 144 | 4 | ... | ... | 4 | ... | 27,20 | ‡ **Ahmad bin Muhammad.** As described and figured in B. M. C. of Or. Coins, vol. III, No. 34, (1 *f*, *another broken in fragments*). |
| 145 | 1 | ... | ... | 1 | ... | 29,01 | * ‡ **Khalaf ibn Ahmad.** *Type:* circular areas with inscribed margins, on both obv. and rev. The coin is in indifferent condition, and the legends difficult to read. Mr. Rodgers remarks as follows: "*Obv.*: خلف under احمد بن in tughrá. *Rev.*: etc. جعفر ابو الامير امربه مما. Margins not quite legible, but the mint Sijistán is quite plain." |
| 146 | 18 | ... | ... | 18 | ... | 51,81<br>43,66 | † ‡ **Táju-d-dín Harab**, sixth in descent from Khalaf. *Type:* obv., quarter-foil within double-lined circle; one pellet in each segment; rev., lettered surface within three circles, the inner and |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MALIKS OF SIJISTÁN—*Contd.* |
| | | | | | | | outermost lined, the central dotted. Plate II, fig. 20. (*f*) |
| | | | | | | | *Obv.* تاج / حرب بن محمد / الدين — *Rev.* لله / محمد / رسول الله / الناصرالدين / محمد |
| | | | | | | | The obv. reads: *Táju-d-dín Ḥarb bin Muḥammad.* |
| 147 | 1 | ... | ... | 1 | ... | 59,40 | ‡ * **Ruknu-d-dín Bahrám Sháh,** grandson of Táju-d-dín. *Type*, obv. and rev., lettered surfaces within double circles, inner dotted, outer lined. Plate II, fig. 21. (*t*) |
| | | | | | | | *Obv.* ركن الدين / ابو منصور بن / بهرامشاه — *Rev.* الله / محمد / رسول الله / الناصرالدين |
| 148 | 16 | ... | ... | 16 | ... | 52,46<br>59,90 | † ‡ **Táju-d-dín Nasar bin Bahrám Sháh**. *Type*, same as No. 146. |
| | | | | | | | *Obv.* تاج / نصر بن / بهرامشاه / الدين — *Rev.* The same as on No. 146, but omitting final محمد. |
| | | | | | | | *Apparently identical with Naṣratu-d-dín, another grandson of Táju-d-dín.* |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MALIKS OF SIJISTÁN—*Contd.* |
| 149 | 3 | ... | ... | 3 | ... | 51,66<br>51,22<br>44,72 | * † ‡ **Asadu-d-dín bin Harab.** *Type*, same as No. 146. (*t*)<br>*Obv.* عضد ابوالمظفر ابن حرب الدين — *Rev.* لله محمد رسول الله الناصرالدين<br>*Not mentioned in Major Raverty's list.* |
| 150 | 6 | ... | ... | 6 | ... | 39,14 | * † ‡ **Undetermined.** Obv., circular area with marginal inscription; rev. lettered surface within lined circle. (one *t*) Plate II, fig. 22.<br>*Obv.* *Area:* ∴ حرب *Margin:* illegible. — *Rev.* ..... (illegible.) لا لله الا الله محمد رسول الله الناصرالدين الله محمد |
| 151 | 1 | ... | ... | 1 | ... | 40,82 | * **Undetermined.** Obv. worn blank; rev. shows only الناصر, and traces of محمد over it. (*b*) |
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA. |
| 152 | 1 | 1 | ... | ... | ... | 50,21 | * **Undetermined.** Circular areas with inscribed margins, on both obv. and rev. The margins are nearly gone, and the areas are much worn. Date *77. The legends as read by Mr. Rodgers, are as follows:<br>*Obv.* خان الخاقان العادل الأعظم ..... ..... ارسلان — *Rev.* لله لا اله الا الله محمد رسول الله امام المسلمين<br>*Rev. margin:* .....سبع و سبعين..... |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA. |
| 153 | 1 | ... | ... | 1 | ... | 63,52 | ‡ **Jingis Khán.** *Type:* lettered surfaces within double circle, the outer dotted, the inner lined, on both obv. and rev. (*t*)<br>*Obv.* عدل / خاقان / الاعظم<br>*Rev.* الناصرا / لدين الله / اميرالمو / منين |
| 154 | 1 | ... | 1 | ... | ... | 46,15 | * **Hulágú Il-Khán.** *Type*, as described and figured in B. M. C., vol. VI, Nos. 21, 25, and Num. Or., No. CCLXXI. But at the bottom of the obv. area is the mint *Isfaráin* اسفراين. Both margins are entirely cut away. |
| 155 | 1 | ... | 1 | ... | ... | 42,60 | * **Abágа Il-Khán,** Obv. has inscription in Mongol characters, giving the name *Abágáin;* rev. has the devise of the Seljúqí coins (lion with kalimah), as on No. 143. (*i*) |
| 156 | 1 | ... | 1 | ... | ... | 41,41 | * **Do.** Size and type like B. M. C. of Or. Coins, vol. VI, No. 48; but the legend on the obv. square area is as on *ibid.* No. 51.<br>*Obv.* *Square area:* لا اله الا / وحده لا شريك له / محمد رسول الله<br>*Rev.* Mongol legend.<br>*Marginal sections:* ...سنه احدى... |
| 157 | 1 | ... | ... | ... | 1 | 62,74 | * † ‡ **Do.** Small size; lettered surfaces. Plate II, fig. 23. The legends as read by Mr. Rodgers are:<br>*Obv.* [ابو] قا / [با]د شاه / ...عدل<br>*Rev.* الله / محمد / رسول |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA. |
| | | | | | | | There are four minute crude letters in the space between الله and محمد which may possibly be *Abagha* in Mongol characters. |
| 158 | 2 | ... | ... | ... | 2 | 63,55<br>66,84 | * † ‡ **Do.** Small size; obv. legend surrounded by arabesques within circle; rev. legend within circle. Plate II, fig. 24. |
| | | | | | | | *Obv.* قاان العادل بادشاه — *Rev.* [قاان] العادل هراة |
| 159 | 1 | ... | ... | ... | 1 | 63,29 | * ‡ **Do.** Small size. Similar to No. 157, but obv. legend different. Plate II, fig. 25. |
| | | | | | | | *Obv.* قاان العادل — *Rev.* as on No. 157. |
| 160 | 5 | ... | 5 | ... | ... | 42,52<br>41,19<br>41,49<br>42,43<br>42,87 | * † ‡ **Do.** *Type*, as in B. M. C., vol. VI, Pl. II, No. 41, but instead of stars there is an arabesque between the first and second lines of the legend in the square area. The segments contain arabesques, except one, which has the mint Marv (مرو). |
| 161 | 1 | ... | 1 | ... | ... | 41,97 | * **Do.** In all respects like No. 160, except that the mint is *Isfaráin* (اسفراين). (*f*) |
| 162 | 1 | ... | 1 | ... | ... | 42,61 | * **Do.** Similar type to No. 160, but obv. inscriptions different; those in the marginal segments being in Mongol characters. Only the legend *Khaghanu* (the Great Khan's) in the top-segment is legi- |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHANS OF PERSIA–*Contd.* |
| | | | | | | | ble; the name which would probably have been in the bottom segment is entirely rubbed off. This is most unfortunate, as it has been impossible hitherto to determine the coins of this type with certainty. (*i*) |
| | | | | | | | *Obv.* / *Rev.*<br>*Area:* لا اله الا الله / فان<br>[شريك له] وحده لا / العادل<br>محمد[ رسول الله] / in ornamented hexagram.<br>*Segment on top: Khaghanu.* |
| 163 | 1 | ... | 1 | ... | ... | 49,37 | † * ‡ **Do.** *Type:* obv., circular area with inscribed margin; rev., scolloped circular area with inscribed margin. Both area legends as in No. 162; rev. marginal legend was in Mongol character, of which only traces of last word (*luk sen*) visible. Obv. margin entirely rubbed away. (*i*) |
| | | | | | | | *Obv. area:* As in No. 162. / *Rev. area:* القان / العادل<br>*Margin:* illegible. / *Margin:*..... *luk sen.* |
| 164 | 1 | ... | ... | 1 | ... | 42,56 | * **Do.** *Type:* circular areas with inscribed margins on both sides. Obv. margin entirely rubbed away; on the rev. margin there was the date. (*i*) |
| | | | | | | | *Obv. area:* As in No. 162. / *Rev. area:* القان [ الا ] / عظم العادل<br>*Margin:* illegible. / *Margin:*.....فى سنه ثما... |
| 165 | 1 | ... | 1 | ... | ... | 39,14 | * **Do.** *Type:* circular area with inscribed margins. Obv., creed in area, with date on margin; rev., a bow with 2 dots within it, under the titles. Plate II, fig. 26. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA–*Contd.* |
| | | | | | | | *Obv. area :* الله / لا اله الا / الله محمد / رسول الله — *Rev. area :* قاان / العادل / ⌒ |
| | | | | | | | *Margin*.....ضرب هذا الد |
| 166 | 1 | ... | 1 | ... | ... | 39,89 | * **Do.** *Type :* similar to No. 165; but date on rev. margin, and no dots in the bow. |
| | | | | | | | *Obv. area :* الله / لا اله الا / محمد / رسول — *Rev. area :* قاان / العادل / ⌒ — *Margin :* ضرب.....ستماية |
| | | | | | | | *Margin :* illegible. |
| 167 | 1 | ... | 1 | ... | ... | 43,60 | * **Do.** *Type :* obv., square area within circle; rev., similar area with a bow below titles. Mint *Marv*, date 6**. Plate II, fig. 27. |
| | | | | | | | *Obv. area :* لا اله الا / الله محمد / رسول الله — *Rev. area :* الملك الله / قاان العادل / سكه مرو / ⌒ |
| | | | | | | | *Segment at bottom :* و ستماية others illegible. |
| 168 | 1 | ... | 1 | ... | ... | 39,88 | **Arghun.** As described and figured in B. M. C., vol. VI, No. 60. Mint *Baghdád*, date 68*. Mr. Rodgers read the mint *Qazan*, which he supposes to be in Persia. There is no star either on the obv. or rev. (*g*) |
| 169 | 2 | ... | 2 | ... | ... | 38,23<br>37,67 | * † ‡ **Do.** Similar to No. 168; but segments on obv. read as follows : top : مرو |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA–*Contd.*<br>left ستمایه (?)<br>bottom : مرو<br>right : و ثمایین<br>giving the mint *Marw* apparently twice, and the date 68* incomplete. |
| 170 | 1 | ... | 1 | ... | ... | 34,98 | * **Do.** Similar to No. 168, but in obv. area, over الله, a quarter-foil instead of the star of B. M. C., vol., VI, No. 60. Segments illegible, except on the left side فی شهور. (*i*) |
| 171 | 1 | ... | 1 | ... | ... | 38,10 | * **Do.** Similar to Nos. 168 and 170, but in obv. area, over الله, a pyramid instead of a star. Segments, above.....ضرب right hand و ثمایین ; other two illegible. Date * 8 *. (*t*) |
| 172 | 1 | ... | 1 | ... | ... | 38,39 | * † ‡ **Do.** Similar to No. 168; but right hand segment contains a bow; the three others are illegible. (*i*) |
| 173 | 2 | ... | 2 | ... | ... | 38,83<br>36,84 | * † ‡ **Do.** Similar to No. 169, but there is a bow within the rev. area, to the right of the Mongol legend. The segments read as in No. 169, but in different order :<br>top : مرو<br>left : وثمایین — Mint : *Marw.*<br>bottom : مرو — Date : 68*.<br>right : ستمایه...<br>The right hand segment shows traces of some more letters; and it may possibly have contained the unit figure. Plate II, fig. 28. |
| 174 | 2 | ... | 2 | ... | ... | 40,70<br>38,55 | * † ‡ **Do.** Same general type as in No. 168, but the Mongol legend on rev. is enclosed within a double circle, the outer dotted, the inner lined. The obv. area is |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA–*Contd.* |
| | | | | | | | marked by a quarter-foil as in No. 166. The segments read as follows: |
| | | | | | | | top: قازان — *Rev.* |
| | | | | | | | left: عادل — بازار اردو |
| | | | | | | | bottom: بازار اردو — in minute letters |
| | | | | | | | right: شاه زاده (?) — between 2nd and 3rd lines. |
| | | | | | | | Mr. Rodgers remarks on this coin: "This was struck apparently by Gházán or Qázán, the son of Arghun, at the Bazar of the Camp." Plate II, fig. 29. |
| 175 | 2 | ... | 2 | ... | ... | 39,43<br>39,37 | * † **Do.** Same general type as in No. 168, but the square area in obv. is formed by dots, instead of lines. The obv. area is marked by an arabesque. The obv. segments read as follows. Mint *Nísábúr*, date *84. |
| | | | | | | | *Obv.* |
| | | | | | | | top: نیسابور — *Rev.* |
| | | | | | | | left: سنه اربع — نیسابور |
| | | | | | | | bottom: ثمانین — in minute letters |
| | | | | | | | right: illegible — between 2nd and 3rd lines. |
| 176 | 1 | ... | 1 | ... | ... | 37,83 | * **Do.** Same general type as in No. 168, but the Mongol legend on rev. is enclosed in three circles, the exterior ones lined, the middle one dotted. The segments read as on No. 174, but in a different order. Mint *Bazár Urdú*. (*i*) |
| | | | | | | | top: بازار اردو — *Rev.* |
| | | | | | | | left [زان]قا — illegible, except |
| | | | | | | | bottom, right } illegible. — 1st line. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA–*Contd.* |
| 177 | 1 | ... | 1 | ... | ... | 42,19 | * **Do.** A similar type to No. 168, but on obv. double-lined square area within a lined circle, with arabesques in the segments; on the rev. the Mongol legend in a double-lined quarter-foil area enclosed within a double circle, the outer dotted, the inner lined. Mint *Jurján.* Plate II, fig. 30. (*f*)<br>*Obv.* *Area :* لا اله الا الله / محمد / رسول الله / ضرب جرجان<br>*Rev.* *Area :* ∴ Mongol Legend ∵<br>*Segments :* Arabesques. |
| 178 | 1 | ... | 1 | ... | ... | 60,27 | * **Do.** A new type. Obv., circular lined area, with inscribed margin within dotted circle; rev., circular dotted area, with inscribed margin within lined circle. Plate II, fig. 31. (*t*)<br>*Obv.* *Area :* لا اله الا الله / محمد رسول الله / السلطان ارغون / * / *Margin :* illegible.<br>*Rev.* *Area :* قاان / الا عظم / *Sulṭán Arghún* (in Mongol). / الا عظم / *Margin :* لعلك توتى ... / الملك من تشا..... |
| 179 | 1 | ... | 1 | ... | ... | 59,33 | * † **Do.** *Type :* similar to No. 163; but on rev. a plain circular area, with marginal legend in Mongol characters of which only *luksen* legible. Obv. margin worn off; and the illegible scrawls in the last line of obv. area may have given the mint, as in No. 177. (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHANS OF PERSIA–*Contd.* |
| | | | | | | | *Obv.* *Rev.* |
| | | | | | | | *Area:* لااله الا الله محمد رسول الله illegible scrawls *Area:* قاان الا عظم ارغون بادشاه عادل خلد |
| | | | | | | | *Margin:* illegible. *Margin:* ..... *luksen.* |
| 180 | 1 | ... | 1 | ... | ... | 37,40 | * **Do.** *Type*, obv., square area, the segments apparently only filled with dots; rev., small circular area formed by three circles, one dotted between two lined ones; with inscribed margin; mint *Astarábád*, date [68]5. Plate II, fig. 32. (*f*) |
| | | | | | | | *Obv.* *Rev.* |
| | | | | | | | *Area:* لا اله الله محمد رسول الله على ولى الله *Area:* قاان ارغون *Margin:* ... استراباد شهور سنه خمش..... |
| | | | | | | | *Segments:* dots. |
| | | | | | | | Mr. Rodgers read the date ثمان, and observes: "I believe this is the first coin on which appears the formula على ولى الله." |
| 181 | 1 | ... | 1 | ... | ... | 42,66 | * **Do.** *Type:* same as in No. 156. Obv. legends same as in No. 152; segments, which probably contained the mint and date, illegible. Rev., Mongol legend with *Arghunu.* (*t*) |
| 182 | 1 | ... | 1 | ... | ... | 20,26 | * **Do.** A beautiful coin with a complicated design. Obv., small double-lined square area, within an ornamental margin; the segments between square and marginal circle filled with arabesques. Rev., small double-scolloped circular area, within a margin filled with dots. Plate II, fig. 33. (*f*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHANS OF PERSIA–*Contd.* |
| | | | | | | | *Obv.* — *Rev.* |
| | | | | | | | *Area:* لا اله الا الله محمد رسول الله — *Area:* *Khaganu* *Arbad* *Arghunu* |
| | | | | | | | *Margin:* §§§§§§ — ∞ |
| | | | | | | | *Margin:* ●●●●●● |
| 183 | 1 | ... | 1 | ... | ... | 42,67 | * **Do.** *Type:* similar to No. 156, and to B. M. C., vol. VI, Pl. II, No. 48. The obv. legend as on the latter, and as on No. 182. Both sides are almost illegible; the left hand segment on the obv. is read by Mr. Rodgers حنونسان, mint ?" (*i*) |
| 184 | 1 | ... | 1 | ... | ... | 18,89 | * **Do.** *Type:* same as in No. 168, with obv. marked by star, but the whole of margin, and partially sides of areas clipped away, to reduce size. Mint *Shírwán* ( شیروان ) or *Sabzwár* ( سبزوار ) in minute Persian letters between the 2nd and 3rd lines of rev. Mongol inscription. (*g*) |
| 185 | 1 | ... | 1 | ... | ... | 19,36 | * **Do.** Type and legends, in all respects, as in No. 174, but exceedingly clipped to reduce size, as in No. 184. Of the obv. segments only remain, top قاان, and left [ع]اد; of the mint on rev. only [باز] ر اردو (*g*) |
| 186 | 3 | ... | 3 | ... | ... | 42,24<br>41,20<br>42,55 | * **Do.** *Type:* similar to No. 177, obv., square area, within double circle, the inner dotted, the outer lined; segment partly inscribed, partly filled with arabesques. Rev., scollopped area, within ornamental border. Mint *Isfaráin.* (*i*) |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MONGOL IL-KHÁNS OF PERSIA–*Contd.* |
| | | | | | | | *Obv.* *Rev.* |
| | | | | | | | *Area:* لا اله الا الله — Khaghanu |
| | | | | | | | — Arbad |
| | | | | | | | محمد — Arghunu |
| | | | | | | | رسول الله — Deledkeksen |
| | | | | | | | *Segments:* *top* اسفراين — Manghu |
| | | | | | | | *left* / *bottom* } cut away |
| | | | | | | | *right:* arabesque. |
| | | | | | | | The fourth line of the Mongol legend seems to read as in B. M. C., vol. VI, Pl. II, No. 85. The word in the fifth line is new, either *manghu* or *maghnu*. |
| 187 | 1 | ... | 1 | ... | ... | 42,93 | * **Do**. *Type:* similar to No. 168, but obv. legend as in No. 186, and the whole exceedingly clipped, to reduce size. Mint *Nísábúr*. Obv. segments as follows: Top نيسابور; left and bottom cut away; right: ..... في |
| | | | | | | | BUKHÁRÁ HOUSE OF TÍMÚR. |
| 188 | 1 | ... | 1 | ... | ... | 78,07 | **Sháh Rukh**. As in B. M. C. of Or. Coins, vol. VII, Pl. II, No. 61. Date 828, but no mint. (*f*) |
| 189 | 1 | ... | 1 | ... | ... | 79,06 | **Do**. Same type as No. 188, except that the corners of the obv. square form small ringlets. Mint *Sabzawár* (سبزوار) between 3rd and 4th lines of rev. legend. No date, unless worn away below last line. (*f*) |
| 190 | 1 | ... | 1 | ... | ... | 74,41 | **Do**. Same type as No. 188, but a rosette inserted in rev. between رخ and بهادر. Mint *Salṭáníyah* (سلطانيه), date * 47. The obv. is nearly effaced by being double struck |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | BUKHÁRÁ HOUSE OF TÍMÚR—*Contd.* |
| | | | | | | | with بوده. In B. M. C., vol. VII, No. 59, the date occupies the place of the rosette. (*t*) |
| 191 | 1 | ... | 1 | ... | ... | 77,98 | **Do.** Obv., square area divided into three compartments, with one line of creed in each; inscribed segments, entirely gone. Rev., circular area with illegible mint and date 848; inscribed margin, nearly gone. Rev. area is counterstruck with Abu Sa'íd's name. |

| | *Obv.* | *Rev.* | *Counter.* |
|---|---|---|---|
| *Area:* | لا اله الا الله / محمد / رسول الله | *Area:* ضربت (?) ..... ۸۴۸ | کورکان / ابو سعید / سلطان |

*Segments*: illegible. *Margin*: illegible.
Mr. Rodgers reads the date 848. This is doubtful, however; it may be 868.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 192 | 1 | ... | 1 | ... | ... | 70,70 | **Do.** Doubtful. Counterstruck with 898 Khán (خان ۸۶۸); original legends illegible. |
| 193 | 1 | ... | 1 | ... | ... | 76,66 | **Husain Baikara,** Governor of Khorásán (?). Compare B. M. C., vol. VII, No. 123, 126. Counterstruck in lozenge, on obv. بوده استرابان (*Astarábád*); on rev. in smaller lozenge بوده هراة (*Hirát*). Ascription of original coin unknown. |
| | | | | | | | LINE OF SHAIBÁN. |
| 194 | 1 | | 1 | ... | ... | 69,54 | **Abdulláh** II. Too illegible to be determined with certainty. Obv. area has the creed; the rev. area seems to read as in B. M. C., vol. VII, No. 150. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | LINE OF SHAIBÁN—*Contd.*<br>الله ن<br>عـــبد<br>بهادر خا<br>Mr. Rodgers ascribes it to Iskandar Sháh (as *ibid.* No. 145). |
| 195 | 1 | ... | ... | 1 | ... | 40,47 | **Undetermined.** On obv., in scolloped area, ضرب بلخ mint *Balkh*. (*i*) |
| 196 | 1 | ... | ... | 1 | ... | 48,58 | **Undetermined.** Two circular areas. (*i*)<br>*Obv.* ..... ...لا عظم ...والدين<br>*Rev.* ضرب (?) مرو |
| | | | | | | | MANGÍT DYNASTY. |
| 197 | 1 | 1 | ... | ... | ... | 70,50 | ‡ **Muzaffaru-d-dín.** A modern tilla; similar in type to B. M. C., vol. VII, Pl. V, No. 179. Mint *Bukhárá*, date 1297. Legends as *ibid.*, No. 179. (*g*) |
| 198 | 1 | ... | 1 | ... | ... | 48,25 | **Do.** Haidarí type, as in B. M. C., vol. VII, Pl. V, No. 212. Mint *Bukhárá*, date 1278. (*t*) |
| 199 | 1 | ... | 1 | ... | ... | 48,20 | **Do.** A variety of No. 198; but with date 1283 on reverse. Mint *Bukhárá*. (*t*)<br>*Obv.* شریف ـے ضرب بجارا<br>*Rev.* عا محمود قـــبـــت حیدر مرحوم امیر |
| 200 | 1 | ... | ... | 1 | ... | 83,66 | **Undetermined.** Broad thin piece, about $1\frac{1}{2}$ inches in diameter; bilingual, Persian and Chinese. Obv., small circular area with سکه بجارا (money of Bukhárá); broad |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | MANGIT DYNASTY—*Contd.* |
| | | | | | | | ornamental margin, apparently with traces of Persian inscription. Rev., small octagonal area with Chinese legend; broad ornamental margin, apparently with Arabic inscription. |
| | | | | | | | ṢAFAWĪ DYNASTY OF PERSIA. |
| 201 | 1 | ... | 1 | ... | ... | 40,01 | **Ismá'íl I.** As described and figured by Mr. Oliver in J. A. S. B., vol. LVI, Pl. I, No. IV. Mint *Nímroz*, date 929. About one-third is broken off. |
| 202 | 1 | ... | 1 | ... | ... | 79,48 | ‡ **Husain bin Sulaimán.** As in J. A. S. B., vol. LVII, Pl. II, No. XXIV. Mint *Iṣfahán*, date 1130. With a brass loop for suspension. (*g*) |
| 203 | 1 | ... | 1 | ... | ... | 76,96 | **Do.** The same, but mint Tabríz, date 1131. (*g*) With a brass loop for suspension. |
| 204 | 1 | ... | 1 | ... | ... | 74,15 | **Do.** A variety of No. 202; the obv. only, but not the rev., has a marginal circle of pellets. Mint *Iṣfahán*, date 1120. With a brass loop for suspension. (*g*) |
| 205 | 1 | ... | 1 | ... | ... | 82,16 | ‡ **Do.** Another variety of No. 202; as in J. A. S. B., vol. LVI, Pl. II, No. XXI. The obv. margin is inscribed, the rev. margin is studded with pellets; the areas are formed by dotted circles. Mint *Qazwín*, date 1131. With a brass loop for suspension; also pierced near margin. (*g*) |
| 206 | 1 | ... | 1 | ... | ... | 80,40 | **Do.** Another variety of No. 202; as in J. A. S. B. vol. LVI, Pl. II, No. XXII. The obv. margin inscribed, the reverse ornamented with floral design. Mint *Tiflís*, date 1132. With brass loop for suspension. (*g*) |
| 207 | 1 | ... | 1 | ... | ... | 76,90 | * **Mahmúd.** Type the same as No. 204; obv., circular area with margin studded with pellets; rev., lettered surface without margin. No mint or date. With a brass loop for suspension. Plate II, fig. 34. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | ṢAFAWĪ DYNASTY OF PERSIA–*Contd.* |
| | | | | | | | *Obv.* لا اله الا الله / محمد / رسول الله علی و لی الله — *Rev.* سکه صاحبقرانی / ...توفیق الله امیر مهیه... / کاه محمود سما.... / (only partially legible.) |
| 208 | 1 | ... | 1 | ... | ... | 75,29 | **Ashraf**. Type the same as No. 204; like No. 200, p. 67, in B. M. C., of Sháhs of Persia. Mint *Iṣfahán*, date 1137. With brass loop for suspension. (*g*) |
| 209 | 1 | ... | 1 | ... | ... | 85,05 | ‡ **Tahmásp** II. Type similar to No. 202, but the areas are formed by dotted circles, as in Num. Or., No. DLXXI, Mint *Iṣfahán*, date 1147. With a brass loop for suspension. (*g*) |
| 210 | 1 | ... | 1 | ... | ... | 76,37 | **Do**. A variety of No. 209, obv. margin inscribed, as in J. A. S. B., vol. LVI. Pl. III, No. XXIX. See also No. 150, p. 56 of B. M. C., of Sháhs of Persia. Mint *Tabríz*, date 1134. With a brass loop and perforation for suspension. (*g*) |
| 211 | 1 | ... | 1 | ... | ... | 82,44 | **Do**. The same as No. 210, but mint *Mashhad Muqaddas*, date 1137. The margins are entirely cut away, with the exception of one trace at the side with ولي on the obv. With a brass loop for suspension. (*i*) |
| 212 | 2 | ... | 2 | ... | ... | 78,48<br>77,94 | **Nádir**. As described and figured by Mr. Oliver, in J. A. S. B., vol. LVI, Pl. III, No. XXXV, and B. M. C. of Sháhs of Persia, No. 1, p. 72. Mint *Mashhad*, date 1150. In one specimen the date is nearly rubbed out. With brass loop for suspension. (*f*) |
| 213 | 1 | ... | 1 | ... | ... | 61,24 | **Do**. As figured in Num. Or., No. DLXXXV, and described on p. 472. The margins are nearly rubbed away, hence mint and date almost illegible, but probably *Mashhad* 1150. See also J. A. S. B., vol. |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | ṢAFAWÍ DYNASTY OF PERSIA–*Contd.* |
| | | | | | | | LVI, Pl. IV, No. XXXVII. With brass loop for suspension. |
| 214 | 1 | ... | 1 | ... | ... | 74,51 | **Karím Khán** (?). Mr. Rodgers observes: "no name on the coin; obv., the distich as on Karím Khán's coins in B. M. C. of Sháhs of Persia, Introduction, p. lxxxvii. Rev. ضرب دارالمومنین کاشان. Mint Káshán; no date. With brass loop for suspension. (*t*) |
| 215 | 1 | ... | 1 | ... | ... | 40,51 | **Undetermined**. Obv., quarter-foil area with Shí'ah creed, and inscribed margin, nearly illegible. Rev., two scolloped areas, one within the other, and dotted margin. Legend in inner area illegible; outer ..... فی شهور.....(*t*) |
| 216 | 1 | ... | 1 | ... | ... | 22,34 | **Undetermined**. Mint Iṣfahán. Mr. Rodgers reads as follows: "*Obv.* ضرب اصفهان سکو شاه (?) *Rev.* in lozenge مبارک. Margin lost." |
| 217 | 1 | ... | ... | ... | ... | 13,56 | **Medal or Token** of brass. Obv., the Persian rayed and faced sun in middle of wreath of oak-leaves and acorns. Rev., crescent and stars in middle of ditto. |
| | | | | | | | AFGHÁNISTÁN. |
| 218 | 1 | ... | 1 | ... | ... | 163,61 | **Mahmúd Durrání**. A rupee as figured in Num. Chron., IIId Series for 1888, Pl. XIII, fig. 12, p. 352. Mint Hirát, date 1230. Legends on both sides almost entirely worn off. |

| *Obv.* | *Rev.* |
|---|---|
| ..... | ..... |
| | ۱۲۳۰ |
| سلطان محمود | هراه |
| ..... | سلطنه... |
| | ضرب |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | AFGHÁNISTÁN—*Contd.* |
| 219 | 1 | ... | 1 | ... | ... | 41,44 | **Do.** A quater Rupee. Mint gone; date 1241. Most of the legend gone.<br>*Obv.* ..... مستان محمود ..... — *Rev.* ..... ١٢٤١ ...السلطنه ضرب |
| 220 | 1 | ... | 1 | ... | ... | 141,65 | **'Abdu-r-Rahmán.** A rupee. Mint Kábul, date 1298. Very imperfectly struck, showing portion only of legends; edges much hacked about.<br>*Obv.* مير حمن عبد الر ١٢٩٨ — *Rev.* ضرب دار السلطنه [ كابل ] |
| 221 | 1 | ... | 1 | ... | ... | 143,10 | **Do.** A rupee. Another Variety. Mint and date cut away. In the same condition as No. 220.<br>*Obv.* امير الرحمن [ عبد ] — *Rev.* ضرب دار..... ..... |
| 222 | 5 | ... | 5 | ... | ... | 142,17<br>141,52<br>141,21<br>138,41<br>137,75 | **Undetermined.** All Rupees. Mint Kábul; dates, only visible on three, ** 97, *** 4, **** 4. In the same general condition, as Nos. 220 and 221.<br>*Obv.* ن حب يا الزما صا — *Rev.* ضرب دار كابل السلطنه [12]97<br>*i. e.* ياصاحب الزمان |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | AFGHANISTAN—*Contd.* |
| 223 | 1 | ... | 1 | ... | ... | 143,18 | **Undetermined.** A rupee, with an incomplete and unread Persian distich on the obv.; and with mint Dáru-s-Salṭanat Kábul and date 1250 on rev. |
| 224 | 1 | ... | ... | 1 | ... | 46,72 | **Undetermined.** Obv., square area with arabesque in segments; rev., round area with ornamental margin. No mint, date ** 75. *Obv.* *Area :* سنه خمس سبعين ..... *Rev.* ضرب هراة |
| 225 | 1 | ... | ... | 1 | ... | 43,60 | **Undetermined.** *Obv*, lozenge area within ornamental margin; rev., floral geometric figure. *Obv.* ضرب هراة بلده |
| 226 | 1 | ... | ... | 1 | ... | 38,57 | **Undetermined.** A variety of No. 224. Mint Hirát on obv., and date 887 or 878 on rev. *Obv.* ٨ ٨ سنه ٧ *Rev.* هر اة |
| 227 | 1 | ... | ... | 1 | ... | 47,16 | **Undetermined.** A variety of No. 224, but obv. scollopped area, rev. square area. Mint Hirát, no date. *Obv.* ريخ التا فى *i. e.*, فى التاريخ *Rev.* ضرب هراة |
| 228 | 1 | ... | ... | 1 | ... | 36,68 | **Undetermined.** Mint Hirát; date ** 55. Obv., lotus shaped design; the centre has |

| Serial Number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | AFGHÁNISTÁN—*Contd.* |
| | | | | | | | هراة; on two of the pedals عدل; the rest illegible. Rev., in round area: فی خمس سنه و خمسین ..... |
| 229 | 1 | ... | ... | 1 | ... | 77,26 | **Undetermined.** Another variety of No. 225, but of much larger size. Mint Hirát, date 919. *Obv.* ٩١٩ سنه ب هراة [ ضر ] |
| 230 | 1 | ... | ... | 1 | ... | 46,82 | **Undetermined.** Another variety of No. 225; mint Hirát (?), date gone. *Obv.* ضرب دارالسلطنه هراة (?) |
| 231 | 1 | ... | ... | 1 | ... | 34,24 | **Undetermined.** Another variety of No. 225. Obv....ضرب; Rev. illegible. |
| | | | | | | | RÁJPUTS OF INDIA. |
| 232 | 1 | ... | ... | ... | 1 | 52,02 | **Prithví Rája.** As in Ar. Ant., Pl. XIX, fig. 18; Ind. Ant., vol. I, pl. XXV, fig. 21, pl. XXVI, fig. 30; also Chron., p. 64, No. 38. (*t*) |
| 233 | 4 | ... | ... | ... | 4 | 53,23 51,97 | **Cháhada Deva.** With legend *Samantadeva;* as in Ar. Ant., Pl. XIX, fig. 16; also Chron., No. 39, p. 70. (*t*) |
| 234 | 2 | ... | ... | ... | 2 | 51,45 50,74 | **Do.** With legend *Samasarola;* as in Chron., No. 40, p. 70, pl. I, fig. 15, also Ar. Ant., Pl. XIX, fig. 31, 34, 37; Ind. Ant., Pl. XXVI, fig. 31. (*t*) |

| Serial number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | RAJPUTS OF INDIA.—(*contd*) |
| 235 | 3 | ... | ... | ... | 3 | 50,16<br>49,07<br>47,10 | **Madana Pála**. As in Ar. Ant., Pl. XIX, fig. 19, 23, Ind. Ant., Pl. XXV, fig. 16, Pl. XXVI, fig. 27, J. R. A. S., vol. IX, fig. 13; also Chron., p. 62, No. 34. (*t*) |
| 236 | 1 | ... | ... | ... | 1 | 50,03 | **Sallakshana Deva**. As in J. R. A. S., vol. IX, fig. 11, 12; also Chron., p. 62, No. 33. (*t*) |
| | | | | | | | MUGHALS OF INDIA. |
| 237 | 1 | ... | 1 | ... | ... | 175,25 | **Farrokh Siyar**. A rupee. As in Num. Or., No. DCCCCXII, but mint Dáru-l-Salṭanat Láhor, date 1126, regnal 2. (*f*) |
| | | | | | | | SOUTH INDIAN. |
| 238 | 1 | ... | ... | 1 | ... | 47,62 | **Qutbu-d-dín Fírúz**. Doubtful, but see Madras Journal of Literature and Science, for 1888-89, fig. 4, p. 56. Lettered surfaces enclosed within double circle, the inner lined, the outer dotted. (*i*)<br>*Obv.* قطب الدنيا و الدين ؟ *Rev.* شاه (?) فيروز |
| | | | | | | | UNDETERMINED. |
| 239 | 1 | ... | ... | 1 | ... | 104,80 | **Unknown**. Circular areas with inscribed margins. Each area contains the exceedingly crude figure of an animal, which cannot be identified. The marginal legends are almost entirely worn off and quite illegible. (*i*) |
| 240 | 36 | ... | ... | 36 | ... | 39,09<br>23,29<br>13,66<br>12,09<br>11,59<br>7,70<br>7,52 | **Unknown**. Mere copper-drops of varying sizes and weights. Mr. Rodgers observes: "No king's name on them. Some are very small, weighing only 4 grains of copper. They were all made of *drops* of copper which were stamped on both sides by dies bearing Kufic inscriptions. The edges are still con- |

| Serial number. | Number of Coins. | Metal. Gold. | Silver. | Copper. | Mixed. | Weight in grains. | Description. |
|---|---|---|---|---|---|---|---|
| | | | | | | | UNDETERMINED.—*Contd.* vex. Some weigh over 50 grains. They all agree in not being prepared for the die by cutting or hammering. No definite description has yet been deciphered. Some of them have عدل (*'adl*) on one side; some have a geometric device. There is not sufficient inscription on any coin to enable me to assign them to any king." The weights on the margin are those of seven of the best selected specimens. |

N. B. Of the following Numbers there are a number of spare specimens, all being much inferior to those selected for the Indian Museum and noticed in the Catalogue.

Nos. 51—54, 224 specimens.
Nos. 60—70, 48 do.
No. 75, 11 do.
Nos. 76—83, 107 do.
Nos. 84—86, 47 do.
No. 146 , 148 do.
No. 240 , 210 do.

## Postscript.

The foregoing pages had already passed through the press, when I received from Professor W. Tiesenhausen of Petersburg a copy of his paper on the Oriental Coins of Mr. Linévitch, published in the Transactions of the Oriental Section of the Russian Archæological Society, Vol. IV, pp. 289—320. Among the coins described in this paper, I find several which appear to be identical with some in the Museum Collection. Thus Prof. Tiesenhausen's No. 6 shown in his Pl. I, figs. 2, 3 is the same as Ind. Mus. Cat. No. 77. The mint is read by the Professor as جرزوان. His No. 7 seems to be the same as Ind. Mus. Cat. No. 51, but in the woodcut, accompanying No. 7, the horse is shown without a saddle. His No. 8 (with a woodcut) is the same or nearly the same as Ind. Mus. Cat. No. 101. Others are: No. 1 = Ind. Mus. Cat. No. 149; No. 3 = Ind. Mus. Cat. No. 95 or No. 105. Prof. Tiesenhausen's No. 29, which is dated 798 A. H. in Tímúr's reign, very much resembles Ind. Mus. Cat. No. 230; and the latter, therefore, is probably to be attributed to Tímúr. So are, in all probability, Ind. Mus. Cat. Nos. 224, 225, 226, which in design have much resemblance with No. 230. In fact, the date of No. 226 is probably to be read 788 in Tímúr's reign. No. 229 of the Ind. Mus. Cat., to judge from its date 919 A. H., may be a coin of Ismá'íl I, the first king of the Ṣafawí dynasty of Persia (905-932 A. H.).

*Central Asiatic Coins in the Indian Museum.*

COLLOTYPE.—HEBERLET BROS.